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Projections of Manpower Requirements and
Implications of Their Use in Non- 1



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PROJECTIONS OF MANPOWER REQUIREMENTS
AND IMPLICATIONS OF THEIR USE IN
NON-UNIVERSITY POST-SECONDARY
EDUCATIONAL PLANNING

By

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THE ALBERTA COLLEGES COMMISSION



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CHAPTER 1

INTRODUCTION

In the spring of 1971, the Alberta Colleges Commission undertook to develop a rationally based master plan for the system of formal post-secondary non-university and continuing education in the province.

Since college education* is concerned partly with the preparation of students for some occupation or vocation, it is appropriate that some decision concerning program offerings, college facilities, space utilization, and financial priorities be made on bases which account for the manpower requirements of the Alberta economy.

This was the essence of the planning methodology which was adopted by the Commission (see Preface): manpower data was to be considered in conjunction with information on client needs, social needs and values, population and enrolment projections, alternative philosophies, goals and programs for a college system in Alberta, and existing programs and services in colleges.

Purpose of the Paper

The Planning Branch of the Alberta Colleges Commission has proposed that a monograph be written in which manpower requirements in Alberta and

*In this paper "college education" will refer to non-university post-secondary education and continuing and extension education of a formal and publically supported nature. "College" will refer to an institution offering programs in this type of education; "public college" to those "colleges" normally under the jurisdiction of the Alberta Colleges Commission. The term "community college" will refer to the same type of institution as does the term "college."

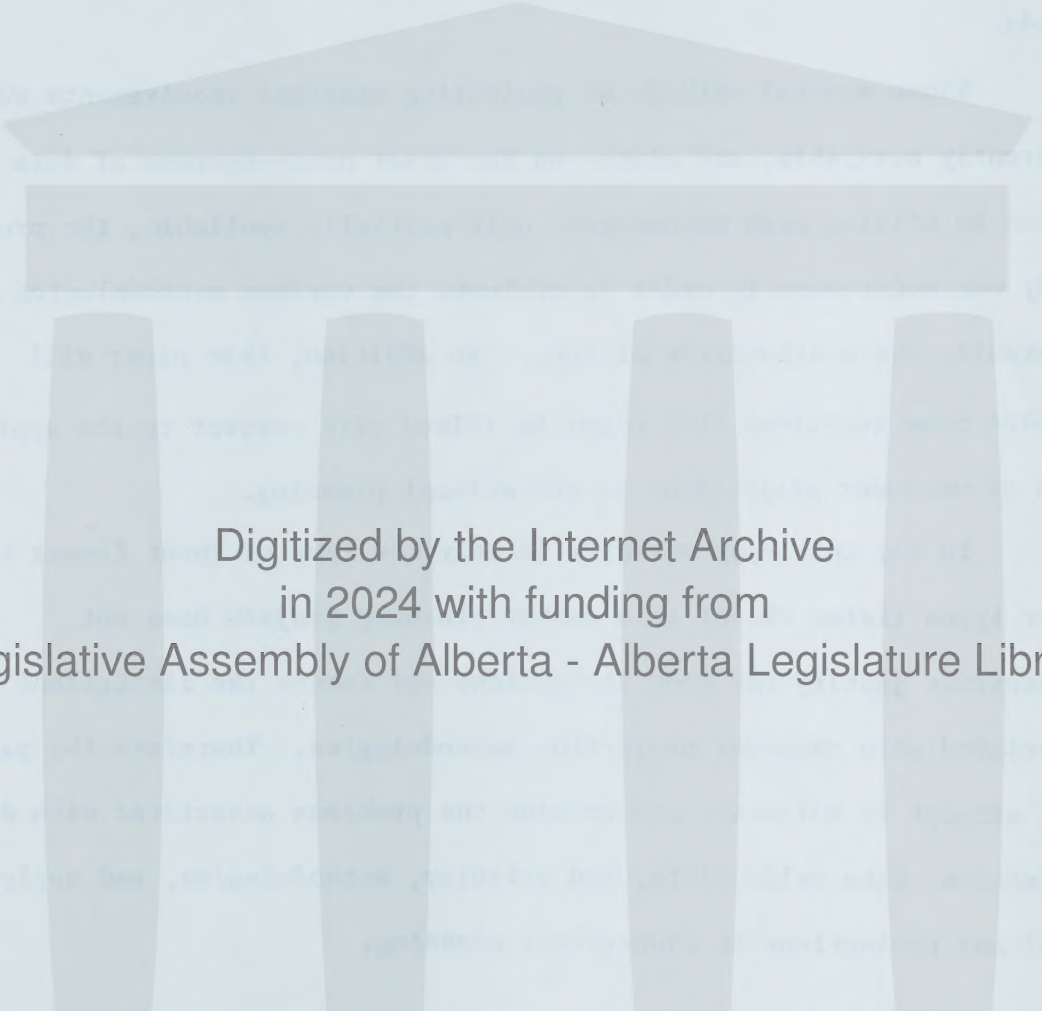
in eight college regions in the province will be projected on the basis of existing provincial data concerning the economic situation and economic trends in Alberta, and in Alberta as a part of the rest of Canada.

Since several methods of projecting manpower requirements were apparently available, and since--on the other hand--sources of data needed to utilize each method were only partially available, the present study was undertaken in order to evaluate the various methodologies and to examine the availability of data. In addition, this paper will examine some questions that might be raised with respect to the application of manpower projections to educational planning.

To say that manpower data is only one type of input (among the other types listed above) to a master planning project does not necessarily justify the many assumptions nor remove the limitations associated with manpower projection methodologies. Therefore the paper must attempt to delineate and examine the problems associated with data collection, data reliability, and validity, methodologies, and applying resultant projections to educational planning.

Organization of the Paper

Subsequent chapters of the paper will suggest several methodologies for projecting manpower requirements and will examine assumptions, requirements, availability and limitations of data associated with each methodology. Chapter 5 will briefly examine in a more general manner the implications of applying manpower projections to educational planning. Chapter 6 will speculate on specific ways of applying projected manpower requirements to developing a master plan for the college educational



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system in Alberta, and will conclude the paper by presenting six interim recommendations.

Chapter 2

METHOD I FOR PROJECTING MANPOWER REQUIREMENTS

INTRODUCTION

A longitudinal survey of Alberta firms' current and anticipated manpower shortage was initiated by Gordon Wright in the spring of 1966. Mr. Wright of the Labor Research Branch of the Alberta Department of Labor has continued the survey each successive year until the present--summer, 1971. The findings of the seven year study will likely be published by early 1972.

The purposes of the survey were:

1. to determine current labor shortages in Alberta industries;
2. to establish Alberta's manpower requirements in the future;
3. to examine current training facilities and future training needs; and
4. to analyse changes in labor market conditions since 1966.

Although all four aspects are of great interest to educational planners in provincial colleges and college authorities, the first two purposes tie in precisely with the terms of reference of the Master Plan: (1) being able to project net labor shortages to appropriate years in the future is the essence of having manpower input data. A six or seven year base from which to make such projections is desirable. (2) if firms' predicted needs for any year are similar to the actual needs, the degree of validity of firm's ability to access their requirements is established.

Theoretical Basis of Method I

Method I surveyed a sample of firms in the economy over a period of years. Managers, administrators, etc. within the firm were asked to estimate by occupational categories their total current job openings, job openings predicted in twelve months and the number of openings which are anticipated to be filled by promotion, normal recruitment, and so on.

The method assumed that individuals or groups within a firm are well qualified to know the firm's requirements for manpower: respondents are familiar with the firm's goals, success, growth, problems, hiring policies, and so on. Projections made in light of such factors should be superior to those made by outsiders on statistical or other types of rationales.

Data Required

Firms surveyed must provide at least four types of data for all occupational categories represented by their employers in the current year and by potential employers in the following year:

1. total current job openings in the current year.
2. number of openings expected to be filled.
3. total anticipated job openings in the following year.
4. number of openings expected to be filled next year.

Numbers of openings expected to be filled are subtracted from the job openings in (1) a current year and (2) in the following year.

Labor force data are also required if trends in number of job-openings are to be viewed in a realistic context:

1. employment by occupation in the "current" year, and
2. predicted employment by occupation in selected projection years.

Treatment of the Data*

Calculation of the actual number of job openings per occupation in a given projection year can be done in at least two ways:

1. The current number of openings in each occupation are multiplied by the estimated size of the total labor force in the projection year; the product is then divided by total number of job openings in the sample in the current year. This requires the assumption that actual employment by occupation to total actual employment is equal to job openings by occupation in the sample to total job openings in the sample.

2. Openings in each occupation are multiplied by the ratio of the current total labor force to the number of employees in the sample. The resultant adjusted number of job openings in each occupation are projected lineally or log-lineally to desired projection years.

The second alternative seems most acceptable because it assumes only that the sample is broadly representative of the labor force. The first alternative would require the assumption that employment-by-occupation to labor-force ratios are constant over time and that those in the sample are equal at a given point in time to those in the Alberta labor force.

Analysis by the Alberta Department of Labor Research Branch has indicated that using *current* data for establishing the reliability of firms' *anticipated* manpower requirements is of a limited value.** The reason

*Proposed treatment, since the results of the survey were not available when the present draft was prepared. Hopefully, the results will be available in time to be attached herewith.

**It should be emphasized that the limitations of data from the Alberta Department of Labor were imposed as a result of the Commission's attempt to apply them in ways which the Department did not initially intend.

for this may not be that estimated requirements for an occupation in year $n-1$ did not match actual requirements in year n ; rather, in many cases, firms did not refer to comparable occupational categories from one year to the next.

Thus, for the purposes of the Alberta Colleges Commission, the anticipated manpower requirements are not of crucial importance. Similarly, any reliability of firms' reported manpower requirements must be inferred from their general knowledge of their own current operations rather than from their ability to identify those manpower shortages which they expect to occur by specific occupations in the future.

Limitations of Method I

Data availability. The first time that Method I is used requires that data be collected over a period of years. If firms were surveyed every year as a matter of course, this disadvantage would be overcome.

The nature of the sample of firms. That only a sample of firms was surveyed each year has already been noted as imposing a limitation. If every firm in Alberta were surveyed each year, or if a more representative sample were derived and interviewed yearly, then this second limitation would be lessened.

Subjectivity. The number of firms surveyed requires that an interviewer visit each firm. Thus there are at least two subjective aspects to the data may adversely affect their usefulness. First, the interviewer's perceptions and recording procedure may vary from firm

to firm; and, several interviewers must be employed if all firms in the sample are to be visited each year. Second, respondents will interpret questions differently and answers to each item may not always be comparable. Because of inherent differences among firms, it would be extremely difficult to construct a standard questionnaire which would be completed by all firms. Further, the rapport of an interviewer will unquestionably yield a much higher rate of return than would a mail-out questionnaire.

Assumptions. The considerable number of assumptions associated with the use of Method I further limits the usefulness of the study since many of these assumptions are untenable:

1. near perfect occupation by occupation representativeness of the Alberta labor force by the sample;

2. historical trends in occupation patterns will continue in future,

3. there is comparability of labor force data from year to year as compiled by the Alberta Bureau of Statistics.

4. Alberta Department of Labor statistics are suitable for the purposes of the Alberta Colleges Commission even though they were collected for purposes not perfectly coincidental with those of the latter agency.

5. no new occupations will emerge in the next five or ten years.

In fact, with new technologies and services continuing to emerge in our economy, this assumption cannot be made; therefore, the subjectively made adjustments in various types of projections will be required as was suggested earlier.

FINDINGS OF THE ALBERTA DEPARTMENT OF
MANPOWER STUDY

In August of 1971, preliminary analysis of job-opening data collected between 1966 and 1970 was conducted by the Research Branch of the Department of Labor.

Table 1 shows the number of firms surveyed, the number of employees accounted for in these firms, and the criteria used for selecting which firms in the Province would be included in the sample. For example, in 1967 the surveys were restricted largely to firms employing 50 or more persons. However, it should be noted that in the hospitality industry, a considerable number of firms employing fewer than 50 persons was included.

Table 2 shows the "net requirements" by occupation for the years 1966 through 1970 as calculated by the Department of Labor. Also included in this table are conversions of actual net numbers to adjusted net numbers more accurately reflecting the total labor force from which the sample was derived. Adjusted net requirements to the years 1976 and 1981 could be calculated in accordance with one of the means suggested above.

Table 1
Sample of Firms Interviewed during
The 1966 to 1970 Manpower Survey*

Year	Number Of Firms Surveyed	Number of Persons Employed in Those Firms	Criterion for Inclusion ¹ In Sample	Size of The Alberta Labor Force	Number of Employees in Firms as a %-age of Labor Force
1966	2,066	216,923			
1967	918	178,240	50 ²		
1968					
1969					
1970					
1971					

*SOURCE: Research Branch, Alberta Department of Labor

¹The numbers in this column refer to the minimum number employees which had to have been employed by firms before that firm was included in the sample.

²Except for the hospitality industry where firms with fewer than 50 employees also were included in the sample.

Table 2

Job Openings in Selected Firms in Alberta
Translated to Provincial Job Openings
in 1966 to 1970 and in Three
Projection Years

Job Openings by Occupation in Alberta												
Occupation	1966		1967		1968		1969		1970		Projected Openings	
	Net	Adj ¹	Net	Adj ¹	Net	Adj ¹	Net	Adj ¹	Net	Adj ¹	1976 ³	1981 ³ 1986 ³

*SOURCE:

¹ Net numbers of job openings are ~~the~~ total number~~s~~ of job openings minus the number~~s~~ expected to fill in each occupation category as reported by those firms included in the survey each year. Adjustments are made in an attempt to indicate the numbers of openings in the entire province. Job openings in each category are multiplied by the ratio:

$$\frac{\text{Total number of employees in Alberta}}{\text{Total number of employees in the Sample}}$$

[See explanation and assumptions implicit on pages 6, above.]

Chapter 3

METHOD II PROJECTIONS

INTRODUCTION

The Projections Studies Unit of the Research Branch of the Canada Department of Manpower and Immigration has been developing a technique for projecting manpower requirements. The present state of this technique is explained in a synthesis by Ken Scott (1970) of the efforts of such persons as B. Ahamad, R. Bodkin, A. Egan, N. M. Meltz, and G. P. Perry.

In the quest for manpower projection methodologies, the Commission learned not only that the Canada Manpower methodology was as sophisticated as any available techniques, but also that Mr. Ken Scott of the Research Branch was prepared to adapt the techniques for application to provincial data. Mr. Scott and his staff were also willing to assist in the identification of suitable provincial data, and to adapt the computer program where necessary.

THEORETICAL BASIS OF METHOD II

A "T-Matrix" (technological matrix), and an "E-Vector" (employment by industry vector) are constructed and multiplied together to yield an "R" (result) matrix which is collapsed to vector listing the total number of manpower required for all industries in each of a specified number of occupational categories.

The T-Matrix

These are constructed for each of three base years, 1941, 1951, and 1961, using the 211 occupational categories from the Canadian 1966 census form and twelve major industrial classifications (from the Standard Industrial Code, SIC). A T-Matrix comprises a 211 x 12 table. Each of 2,532 cells contains the number of persons employed in the Canadian economy in a particular occupation and a particular industry; this value is divided by the column total yielding a coefficient which in turn is divided by the corresponding coefficient for the year 1961 thus providing indices in each cell of the three matrices.

The log of each index is computed and the logs for corresponding occupations are plotted on graphs which extend them lineally to desired projection years. Antilogs in each projection year yield indices for that year, and the indices multiplied by the 1961 coefficients coefficients for the projection year. The projections are made so that high and low coefficients are established for every cell in each projection year.

E-Vector

In the model developed by Canada Manpower and Immigration, employment-by-industry ratios are projected to appropriate years from capital input-output tables according to a technique described in Ahamad (1969). Suffice it to say that high and low values for E are estimated for each projection year; that is, a high value and a low value of employment by industry for each of 12 industries result.

Resultant Projections

The multiplications involved in combining the T-matrix for the projection year with the E-vector for the projection year are done in such a manner that two answers are given for each occupation. ($T_{low}^{high} \times E_{low}^{high}$ should yield *four* results; however, one high and one low result are calculated so as to describe the limits of a 95 percent probability range).

APPLICATION OF METHOD II

Data Required

To be used without modification, Method II requires the following input data: T-matrices of indices for each of 1941, 1951, and 1961; and, projected employment by 12 industries as calculated from output and capital input by industry over a period of at least 5 years.

Data Available for Alberta Projections

It was virtually impossible to secure *any* of the above data for Alberta. However, with modifications, the computer model was able to handle somewhat cruder versions of each required type of data input.

T-matrix. An annual report published by the Alberta Bureau of Statistics (1970) includes an industry-occupation matrix for the year 1970. Earlier editions of the report containing similar matrices were available; however, matrices are not comparable from year to year because the job descriptions used on questionnaires changed from time to time. Also, the matrices in these reports are not definitive because figures included are from samples of firms which are surveyed annually by the Alberta Bureau of Statistics. In spite of these limitations, and because

the T-matrices required for computer analysis employ indices rather than actual numbers, Mr. Scott believed that the 1970 matrix could be used to estimate Alberta's future manpower requirements. The 1970 industry-occupation indices were to be assumed to be unchanged in the projection years.

Employment by industry. Since yearly input and output to and from Alberta industry could not be determined readily, estimates (low and high) of employment by industry were to be made on the basis of the Alberta Bureau of Statistics monthly charts of employment by industry in Alberta.

Still another problem arose when it was discovered that employment by industry statistics for Alberta were classified according to a different industrial code than that used for the matrix. A.B.S. was requested to recalculate the 1970 industry-occupation matrix according to the S.I.C.

Projections Using Method II

The methodology with all of the above modifications was explained to R. Armit and D. Istvanffy of the Alberta Bureau of Statistics during the presentation of the request that the 1970 industry occupation matrix be recalculated. They advised the Colleges Commission to abandon any plans to utilize Method II until better provincial data were available. Although the matrix could be recalculated using SIC industrial classifications, the other modifications to the technique (discussed above) would almost certainly yield projections of manpower requirements of highly questionable validity.

Summary of Problems Encountered in Method II

At the present time, the following assumptions or modifications preclude the use of Method II in the present study:

1. T-matrices for projection years must be assumed to be equal to a T-matrix for 1970. Normally, Method II should incorporate the projection of a T-matrix for a projection year from three historical matrices.
2. If the 1970 matrix were used, it would have to be assumed to be representative of the Alberta economy since the matrix was constructed from data on a sample of Alberta firms rather than on data from all Alberta firms.
3. If the 1970 matrix were used, it would first have to be recalculated for those 12 industries defined by the Standard Industrial Code system of classification. (As a result, the Canada Department of Labor would have had to re-enter the matrix in their computer program since the 1970 Alberta matrix was read into the computer prior to the discovery that recoding by SIC was required).
4. Employment by occupation statistics would have to be calculated for projection years according to some method other than that which the Canada Department of Manpower computer model is designed to apply. This would require the assumption that other projection methodologies would yield high and low E values not significantly different from those generated from capital input and output data.

Unfortunately, all of the above problems will be re-encountered each time that Method II projections are desired unless steps are taken by such authorities as the Alberta Colleges Commission to have additional

data gathered and compiled before subsequent manpower studies are undertaken.

Recommendation

Since the master plan for Alberta non-university post-secondary and continuing education calls for regular updating of both input data and resultant findings, and since Method II, proper, appears to be potentially valuable for providing manpower data, the Planning Branch should endeavor to secure for subsequent manpower studies those provincial data required for analysis by Method II.

A year or two of advance notice may well be sufficient time for such data to be collected. However, it may be necessary to demonstrate to data supplying agencies that such data are imperative for educational authorities engaged in planning projects. If several educational authorities prepared consistent or combined requests for such data and defended the importance of having access to such data, data collection and supplying agencies would likely be much more disposed to cooperating than if several requests for data were made independently.

Finally, by the next time that manpower studies are commissioned by the Alberta Colleges Commission in its reassessment of its Master Plan, the techniques built into Method II will no doubt have been refined by the Canada Department of Labor.

In summary, Method II should be adopted in subsequent manpower studies to be used in educational planning.

Chapter 4

METHOD III PROJECTIONS

The third method for projecting manpower requirements in Alberta is actually a simplification of the T-matrix aspect of Method II. If certain assumptions are made, and if the various industrial sectors of the economy are not disaggregated, historical levels of employment in each of several occupational categories can be projected into the future.

RATIONALE FOR METHOD III

Census data (Alberta) on the numbers of employees in each of a wide range of occupation are compiled for the years 1941, 1951, and 1961--or for those census years deemed appropriate; for example, 1971 data will be available in a year or two. For each occupation, the number of employees is projected to selected years according to the standard growth curve.

Since this method is not really theoretically based, there are several factors unaccounted for, but which likely should be taken into consideration:

1. Position on the growth curve. The combination of two facts confound the application of log-linear projections to historical data.
(a) Only three historical points produce a graph which may be difficult to "fit" to a standard growth curve. (b) No projection of economic growth is completely accurate on the basis of historical data only. This

is particularly true when changes (other than just growth) are readily apparent. As a result, every projection must be subjectively assessed--and appropriately adjusted--in light of observations on the dynamics of the economy and following scrutiny of the three-point graph.

2. Assumptions required. Method II must be employed under the following assumptions:

- (1) Employment by industry ratios remain constant from 1941 (the first base year) until the latest projection year.
- (2) The ratio of the labor force to the population remains fixed from the first base year until the last projection year.
- (3) A selected disaggregation of occupations for the base year remains as the most appropriate one during the projection period.
- (4) Job descriptions remain constant in each occupational classification during the historical period and the projection period.

APPLICATION OF METHOD III

Data Required; Data Available

The Dominion Bureau of Statistics was able to provide employment by occupation data for each of 1941, 1951, and 1961. Although job descriptions and occupational categories included in the census forms may have varied during the twenty year period, D.B.S. has converted all data so that they are comparable. These data as described are available by province as well as by all of Canada in D.B.S. catalogues 94-551 and 94-531 (Appendix B).

Recommendation

Method III should be applied for all those occupations for which required education could be the responsibility of the college system.

Each projection must be done by hand, or subjected to individual scrutiny.

Certain professional, paraprofessional, and "support" occupations should be considered in clusters. For example, in medicine, the changing demand for doctors, for nurses, for technicians, for aides, and so on are interrelated; none can be considered in isolation.*

*This approach should be considered regardless of which Method or Methods are adopted in a manpower study.

Chapter 5

IMPLICATIONS OF PROJECTED MANPOWER NEEDS FOR EDUCATIONAL PLANNING

In the preceding chapters, difficulties with projecting manpower requirements lay primarily in the availability of (1) sufficient raw data, that is, detailed information from all sectors of the economy with respect to numbers of persons and number of dollars earned and expended; (2) analyses of raw data yielding statistics which, in turn, could be used in a wide variety of ways for examining the manpower situation in provinces--as well as in Canada--both at the present time and in the future.

It is also quite clear that, since data collectors and compilers cannot accommodate every conceivable need before such need arises, those who may require data must demonstrate the importance of having data collected and compiled in certain ways. It is not sufficient to say this or that data are needed; in addition, the value of methodologies and the application of final results to education or some other field must be established.

This paper is concerned with applying manpower projections to educational planning. Since a great deal has been written about this topic already, the first part of Chapter 5 merely provides highlights of some implications of manpower projections for educational planning from the literature. In Chapter 6, the usefulness of Alberta manpower needs in particular will be considered in light of the educational master

plan being prepared by the Alberta Colleges Commission for post-secondary non-university and continuing education.

REVIEW OF PERTINENT LITERATURE

A recent study reported by Hollister (1966) was the Mediterranean Regional Project (MRP) by the Organization for Economic Cooperation and Development (OECD). The answers to two questions were sought:

(1) Is the impact of manpower requirements on the educational system quantitatively significant enough to justify the considerable effort involved in making detailed estimates of requirements?

(2) If [yes], are present methods [nevertheless] so inaccurate that . . . requirements cannot be estimated? (Hollister, 1966:339).

Later, Hollister (1966:339) examined additional considerations which imply that even if manpower requirements can be accurately predicted there may be some fundamental characteristics of the economy which render predictions useless in planning:

1. The number of workers in a particular occupation who are required for unit of output may not be constant in all sectors at a given point in time.

2. There may be changes in output for manpower unit due to technological changes.

3. Since the accuracy of projections may depend upon the degree to which the economic structure and labour force are disaggregated, optimum numbers of industrial and occupational classification would have to be derived.

4. We may be ignorant of the exact relationship between a given occupation and the educational background "required" for it.

Nonetheless, Hollister (1966: 345-6) on the basis of the MRP, concluded that manpower requirements have a significant impact on educational output. In a ten year period, more than 50 percent of the changes in required educational output were determined by manpower requirements (not counting growth in educational output required to keep up with the growth of the labour forces).

This--in spite of Hollister's conclusion--was the only favourable finding. In fact, even the above does not necessarily support the usefulness of predicting manpower needs because it is likely a truism that "manpower requirements have a significant impact on educational output." The problem seems to be determining if it is possible to learn *in what way* and *to what extent* manpower requirements affect educational output. Hollister's further conclusions point to the failure of the MRP to qualify the effects of manpower needs on education:

1. Significant changes (up to 20 percent) in educational requirements did not result from allowances for different number of workers at a point in time being required for the same unit of industrial output.

2. Similarly, productivity changes did greatly affect estimates of manpower needs.

3. There seemed to be ". . . no guarantee that the effort to disaggregate data will yield better estimates than could be obtained from aggregate information." (Hollister, 1966: 347).

4. Assumptions that there were a somewhat stationary relationship between occupation and education were shown to be untenable. This conclusion was echoed by Cash (1965: 100) who asked whether the knowledge of the relationships linking education and the economy are sufficiently

advanced for the use of high level manpower planning techniques to induce maximum rate of economic development in New Africa.

Blaug (1967: 81) commented that the collection of data required for manpower studies is lagging because in fact there are few economic theories of manpower which might guide such endeavors, because data are scarce or incomplete even when one knows what data are desired, and because there is little rapport between firms and outside planners.

In an extensive review of literature on educational planning, Blaug (1966: 71) suggested that even if manpower needs are more or less accurately forecasted: "there remains the still controversial question of translating these manpower needs into the desired supply of educational output."

Very little is known about the way firms utilize educated people despite decades of research.

The discussion of manpower problems is often confounded by the misleading concept of "shortage" because shortage seems to ignore trends in the labour market and in earnings (Blaug, 1966: 72-3).

Chapter 6

APPLICATION OF PROJECTED MANPOWER NEEDS IN ALBERTA TO POST-SECONDARY NON- UNIVERSITY EDUCATIONAL PLANNING

INTRODUCTION

In Chapter 1, a master plan, its purposes, and its methodology were discussed. The main point as far as this paper is concerned is that projected manpower requirements for Alberta were specified as a significant part of the data to be inputted into the master plan which would ultimately recommend policies concerning the implementation of nre programs and services in the various community colleges and public colleges in Alberta.*

It is not clear precisely how manpower data will be utilized in developing such policies for the Master Plan (A.C.C., 1971). In order to assess the usefulness of manpower needs for the master plan, it is necessary to speculate upon the most probable ways in which manpower projections might be employed.

SOME PROBABLE WAYS OF UTILIZING MANPOWER PROJECTIONS

First, it is likely that trends in ratios among employment rates in occupations will be examined in terms of continuing or shifting priorities respecting present program offerings. For example, according

*Definitions of "colleges" are provided on page 1.

to Seastone (1971: 88-89) the occupational group "management" comprised 8 percent of the Alberta labour force in 1951. This percentage increased by 3.9 percent annually until 1961 when it was 8.5 percent of the labour force would be employed in management positions by the year 1971.

Table 4 shows the effects of similar trends in "sales" and "transportation and communications," for example. On the other hand such occupations as "miners and related workers" decreased from 2.1 percent of the labour force in 1951 to 1.1 percent in 1961, and to 0 percent in 1975.

Returning to the example of "management," the master plan might recommend increases in total enrolment of students in management and management related programs. Although this is reasonable, there are at least two bothersome factors to account for in setting the extent to which enrolments might be increased.

1. Universities offer programs in this field and the scope of the master planning project excludes universities.

2. A considerable number of "managers" will be employed--and are employed--because they will be or have been promoted from other positions without receiving formal education.

Soon, if these factors could be controlled, some assumptions are implicit in observing trends such as those in Table 4.

1. on-the-job output is a function of the number of persons employed in a particular occupation.

2. on-the-job output is related to educational output to qualified manpower.

Table 4
Alberta Labor Force by Major Occupational Groups,
1951-1961

	No. of Workers 1951	% of Total	No. of Workers 1961	% of Total	% of Total Labor Force Method A ¹	% of Total Labor Force Method B ²
Management	28,350	8.0	41,691	8.5	9.2	9.8
Professional & Technical	23,874	6.8	46,579	9.5	16.5	16.3
Clerical	30,361	8.6	55,317	11.3	14.6	17.7
Sales	18,496	5.2	31,629	6.5	7.1	9.2
Service and Recreation	34,895	9.9	59,055	12.1	14.5	17.0
Transportation & Communication	18,829	5.6	28,261	5.8	6.0	6.4
Farmers & Farm Workers	114,926	32.5	104,162	21.3	10.2	10.5
Loggers, Trappers, Hunters, Fishermen	2,303	0.7	3,009	0.6	1.4	0.6
Miners & Related Workers	7,469	2.1	5,291	1.1	-	-
Craftsmen, Pro- duction & Related	54,177	15.3	83,449	17.1	19.3	20.7
Laborers	16,771	4.7	19,615	4.0	3.6	3.4
Occupation not stated	2,046	0.6	11,453	2.3	-	-
TOTAL	353,497	100.0	489,511	100.0		

¹Estimated for the Prairie Region by B. Ahamad, *A Projection of Manpower Requirements by Occupation in 1975*, Department of Manpower and Immigration, Canada, 1969.

²Projecting rate of change from 1951 to 1961, to 1975.

SOURCE: Alberta Bureau of Statistics.

Projections of Employment by Occupation

Trends in employment by occupation can be projected to desired future years by Method I and Method III. If certain policy decisions are made, or if one assumes that they will soon be made, the examination of historical and projected numbers of employees by occupation should be valuable in translating manpower projections into statements about required program types and required program enrolments.

The translation procedure. Although many specific formulas or rule-of-thumb can be developed, and although their derivation is the responsibility of the policy-makers who will present the master plan for implementation, it is useful to examine briefly a possible translation formula in order to point to some implications of the use of manpower predictions for educational planning.

1. Step A. The provincial population "served" per manpower unit per occupational category in year Y is calculated: Participation rate, $R_y = \frac{S_y^A}{P_y}$, (where S_y^A is the number of persons in occupation A in the year Y, where P_y is the population of Alberta in year y).

2. Step B. Calculate S for a projection year $y + n$:

$$S_{y+n}^A = \frac{S_y^A \times \left(\frac{P_{y+n}^A}{P_y} \right)^{?}}{P_y} \quad (\text{where } S_{y+n}^A \text{ is the number of persons "required to be in occupation A in the projection year}).$$

3. Step C. Calculate the new entrants required for occupation A:

$$RQ_{y+n}^A = S_{y+n}^A - S_y^A. \quad \text{The average number of new entrants required yearly is } \frac{RQ_{y+n}^A}{n}.$$

4. Step D. There is an actual or an assumed policy decision which prescribes that if RQ number of entrants are needed per year in occupation A, they should be formally trained--to some extent--rather than imported from outside the province or chosen by employers from persons in other occupational categories, on the basis of their work experience--that is, practical education. (The policy may recognize that some proportion of practically trained persons will compete with persons formally educated in an occupation..

5. Step E. A set of formal training requirements for occupation A should be derived by educators which combines elementary-secondary schooling and some amount of appropriate post-secondary training. The responsibility for Step 5 may well be within this jurisdiction of college administrators rather than that of the master plan steering committee of the Colleges Commission. The five steps are repeated for all occupations selected by the planners and/or college administrators.

Problems with Deriving Rules of Thumb

In the first place, the literature suggests that the probability that projected numbers of required manpower are accurate must be very low because of the built-in assumptions of fixed relationships between the economy and the educational system. Finally, because of the possibility that the above two types of errors may be ^{interactive} ~~multiplicative~~, care must be taken in applying translation formulas or rules-of-thumb.

Similarly, it will be difficult to assess immediately whether a program should continue for more than one cohort because it is difficult and requires time to follow the careers of the first graduating class.

Finally, the probabilities or errors in manpower predictions increase as projection years are advanced and when required employment disaggregated occupations are translated into college program requirements.

Techniques for Simplifying the Utilization of Projected Manpower Requirements

Since as many as 911 occupational categories have to be considered, techniques for translating projections will require considerable work if every projection has to be scrutinized and adjusted according to expert opinion or to the individual application of several economic factors. At least two procedures might be followed to reduce the number of operations required. (When fewer operations are required it is possible that those remaining can be made with more care and more consideration made of factors requiring subjective analysis.

Determining the number of educational places. Pursual of government policies, projections of budgetary provisions at system and college level as well as at government level enables the number of additional student places in post-secondary non-university institutions to be estimated quite accurately for any desired year in the future. Since the ultimate purpose of using manpower projections in educational planning is to determine how many students should be taking what programs where, knowing the number of places which will be available to students in which localities in what years is valuable because all that remains to be determined is what programs those students should be enrolled in. The sectors requiring the greatest additional numbers of manpower can be determined and ranked. Available educational "places" can be apportioned by assigning students in programs representing the occupation ranked 1 the most places, by assigning students

in occupation 2 a smaller number of places, and so on. What the actual number of places assigned to students representing the various highly ranked occupations are depends upon the number of occupations ranked, the sizes of the differences on which the ranks were determined, desirable pupil-teacher ratios, and a variety of other factors. The important point is that such factors are of a comparatively low order and various interpretations of them will not alter the general usefulness of this technique: that is, all available student places are being used to train students in occupations in which the greatest shortages will likely occur.

The delimitation of the number of occupations to be considered.

Close examination of the occupations discloses two ways in which the number of occupations for which detailed projections need be made and regarding which considerable expert opinion must be sought: (1) disaggregated occupations may be combined because the lower order descriptions are not similarly differential in descriptions of educational requirements for the occupations in question; (2) many occupational categories can be ignored for the purposes of planning in non-university post-secondary education simply because they do not require educational prerequisites of a post-secondary and/or a non-university nature.

RECOMMENDATIONS

1. Manpower projections by occupation (Methods I and II) are viable and necessary inputs to any short or long term educational plan provided that the assumptions and limitations associated with projection methodologies and raw-data are fully recognized and are used to establish probability ranges where the latter may not emerge statistically.

2. Method III should be used as the major generator of manpower projections for input to the first phase of the Master Planning Project for Non-University Post-Secondary and Continuing Education in Alberta.

3. Method II should be used to (1) check requirements for additional manpower which were calculated from Method I statistics. (2) assist the designation to college regions of new or larger programs which concluded to be required in post-secondary educational institutions.

4. Method II should be applied to the most recent data available in the year when a 1971 T-matrix is published by D.B.S. At present, a 1961 T-matrix is available, and an E Sector could be prepared easily by the time the 1971 T-matrix is available (approximately 1974). Also, by 1974 the computer model which applies Method II should have been updated and improved upon by Canada Manpower on the basis of new developments and informed criticisms.

5. Method I should be reviewed after the 1971 raw-data has been analysed and results compared with other types of projections of manpower requirements. Note the work which the D.B.S. is doing with regard to job vacancy surveys and labor force surveys. Their conclusions concerning the usefulness of their methodology may apply in part to Method I.

6. The possibility of a consortium which will coordinate research--including the solicitation and preliminary analysis of data by such agencies as D.B.S. and A.B.S.--should be studied carefully by educational authorities committee to rational application of manpower data in educational planning. Unified and well defended requests for data from planners in many educational sectors and authorities can only improve relations with data suppliers, increase the credibility of educational planning, and result in better availability of high quality data, and hence high quality research.

7. Educational planning on the basis of qualitative--as well as quantitative--considerations should not be ignored.

APPENDIX A

Preliminary report of the study of
job vacancies conducted by the
Alberta Department of Labor

APPENDIX B

Occupation and Industry Trends:

Alberta 1941, 1951, 1961

Changes in the Occupational Classification

Necessary revisions, in the classification of occupations each decade to take account of changes that have occurred in the occupational structure of the country due to developments in the economy,

complicate the task of developing comparable occupational data from census to census. In Table 5 of this report comparisons of census data relating to the economically active population over the period 1911 to 1961 are made only for broad occupation groups. Even at this level of aggregation, regrouping of data was necessary to achieve satisfactory comparability. For Tables 5 and 6 comparisons by broad occupational divisions were prepared on the basis of the 1951 Census Classification of Occupations while for Tables 7 to 11 inclusive the 1961 Classification of Occupations was used as a base. Deviations from the basic classification were resorted to in either case where necessary.

The system of grouping used in the 1961 Classification of Occupations, resembling that of the International Standard Classification of Occupations (ISCO), represents a complete departure from earlier census groupings with a view to creating more homogeneous occupational divisions, major groups and classes. Similarly, the terminology used in the division, major group and class titles, is designed to convey an occupational rather than an industrial flavour.

In addition to the regrouping of classes to provide for greater homogeneity in divisions and major groups and the change in terminology to emphasize that the content is occupational and not industrial, the principal change in the 1961 Classification of Occupations involved the inclusion of all chemical and related process workers in the major group "Paper makers, still operators, chemical and related workers". This involved bringing in categories, not classified in the Chemical group in 1951, such as, those distilling alcoholic beverages, turning a kiln in the production of lime and cement, operating calendering machines in the production of rubber and asbestos products, workers engaged in the refining of sugar, spinners of synthetic textile fibres, beater, grinder and incinerator operators in pulp and paper mills and salt processors and refiners.

Another change affecting the comparability of such classes as "meat canners, curers and packers", "fish canners, curers and packers", "beverage processors" and "bottlers, wrappers and labelers" involved the assembling under "bottlers, wrappers and labelers" of all those engaged in capping and sealing bottles, cans, jars and other containers, those engaged in filling bottles with various types of materials, except in the canning of fruits and vegetables and those engaged in filling cans with various materials except food products.

Source: 1961 Census
of Canada, Dominion
Bureau of Statistics.

Another important change in the application of the revised classification is the assignment of the individual to an occupational class on the basis of the kind of work he performs regardless of his status in the establishment in which his work is carried on. For example, a druggist and an optometrist are classified to "Pharmacists" and "Optometrists", respectively, whether they are self-employed or work for wages or salary.

In the revised classification those doing work of a semi-skilled nature have been removed from the class "Jewellers and watchmakers". Those plucking, dressing and dyeing furs have been removed from the class of "Furriers" and are classified to the "Tanners and tannery operatives" class.

Changes in the classification such as those mentioned above, the creation of new classes particularly in the "Professional and technical" Division such as geologists, physicists, biological scientists, optometrists, pharmacists and economists and others such as driver-salesmen, office machine mechanics, insulation applicers and materials-handling equipment operators, as well as the transfer of occupational terms from one three-digit class to another, limit the number of major groups and classes that may be regarded as comparable between the 1941, 1951 and 1961 Censuses on the revised classification basis. Table 8 shows that only a few of the twenty major groups of "Craftsmen, production process and related workers" are comparable. It also shows that 50 per cent of the 1961 classes are comparable with 1951 but only about 35 per cent with 1941.

Convertibility indexes, prepared from an analysis of the 1941, 1951 and 1961 Classifications of Occupations showing the regrouping of 1941 and 1951 classes to obtain trend figures for divisions and major groups as of 1961, are available upon request. A separate convertibility index is also available showing the combinations and/or additions to the 1941 and 1951 classes made to improve comparability with 1961.

Changes in the Industrial Classification

Revisions of the classification of industries are necessary each decade to take account of significant changes in the structure of Canadian industry due to growth in existing industries, the establishment of new industries, technological developments and the introduction of new materials. Analyses were made of the relationship between the 1941, 1951 and 1961 Classifications of Industries and comparisons have been made of as many industrial classes as appeared possible. In Table 12 of this report comparisons of census data relating to the economically active population over the period 1941 to 1961 are shown by industry divisions, major groups, subgroups and classes.

Changes in the classification such as those mentioned above, the deletion from the 1951 Classification of some 40 classes (one-third from the Agriculture Division and between 35 and 40 per cent from industry major groups related to food, i.e., the dairy products industries, grain mills and wholesalers and retailers of food), the creation of some 60 classes (slightly more than one-half in manufacturing and approximately one-quarter in the service industries) and the transfer of industries from one three-digit class to another limit the number of classes for which comparable data can be supplied for the 1941, 1951 and 1961 Censuses on the revised 1961 Classification basis. Table 12 shows that about 55 per cent of the 1961 classes are comparable with 1951 but only about 35 per cent with 1941 (the latter being due mainly to the 1941 Classification having approximately 100 fewer classes than the 1951 and 1961 Classifications). It should be noted that the titles of a number of classes such as "Sawmills", "Wire and wire products manufacturers" and "Wholesalers of furniture and house furnishings" have not changed since 1951, but their content has been altered sufficiently to destroy comparability.

Convertibility indexes, prepared from an analysis of the 1941, 1951 and 1961 Classification of Industries showing the regrouping of 1941 and 1951 classes to obtain trend figures for divisions and major groups as of 1961, are available upon request. A separate convertibility index is also available showing the combinations and/or additions made to the 1941 and 1951 classes to improve comparability with 1961.

Changes in Enumerative and Processing Techniques

Significant changes in enumerative and processing techniques affecting the quality of enumeration and, therefore, the comparability of population census statistics by occupation and industry for 1961 and 1951 with those of earlier censuses were as follows:

(1) The larger industrial and commercial firms were requested to supply their employees with job descriptions which were to be made available to census enumerators.

(2) A supplementary question on the census schedule soliciting the name of firm or business resulted in more precise industry reporting in 1961 and 1951 than in earlier census years and permitted the use of a pre-coded list of larger establishments.

(3) The coding of occupations and industries was decentralized in 1951 and 1961. Coders in regional offices, being more familiar with the local industrial structure, were able to interpret a greater number of the difficult cases than was possible in earlier censuses when the coding staff was located

in one central office. Furthermore, regional office staff could obtain additional data by local telephone.

(4) It is believed that the extensive use of the electronic computer in the 1961 Census in correcting inconsistencies and insuring a more uniform and flexible edit than could be accomplished manually or by the less intricate mechanical equipment used in 1951 has improved the quality of editing compared with that of earlier censuses, but at the same time it has introduced an element of difference in the statistics on occupations and industries.

Labourers

In Tables 5 and 6, in which occupations are grouped on the basis of the 1951 Census Classification of Occupations, the division "Labourers" includes workers in "unskilled" occupations except those engaged in the operations of farming, fishing, logging or mining (except in oil and gas wells). In Tables 7, 8, 9, 10 and 11 in which occupations are shown on the basis of the 1961 Census Classification of Occupations the division "Labourers" includes workers in "unskilled" occupations except those engaged in the operations of farming, fishing, logging or mining (except in quarries and petroleum and gas wells). This class, as of 1951 as well as 1961, excludes other specified categories such as "Longshoremen and Stevedores" and "Sectionmen and Trackmen" but includes "Warehousemen and Freight handlers, n.e.s.".

While labourers (unspecified) in primary industries are, for the most part, directly engaged in farming, fishing, logging and mining operations and are, therefore, included with agricultural, fishing, logging or mining occupations, as determined by the industry in which employed, those in non-primary industries were grouped together in a residuary group "Labourers" in the occupation tables. This grouping of "Labourers" in non-primary industries is necessary since the term "Labourer", so reported, gives no indication of the type of work performed by the individual. Even knowledge of the industry in which a person is employed does not supply the necessary information as to the type of work performed, since, for example, a labourer in a steel mill might be working in a construction, transport, etc., type of occupation rather than in one directly concerned with a manufacturing process.

Armed Forces

In the 1951 and 1961 Censuses members of the Armed Forces and members of Reserve Units at military camps or with no other jobs during the reference week were to be reported to their rank and classified as "Commissioned officers, armed

forces" or "Other ranks, armed forces" in occupation tables and included in the class "Defence services" in industry tables.

In the 1941 Census members of Reserve Units at military camps and all persons on Active Service on June 2, 1941 were asked to state their occupation prior to enlistment. At the 1941 Census there were 313,452 males and 1,132 females on Active Service, of whom 249,934 males and 889 females were gainfully occupied prior to enlistment. In the historical occupation and industry tables in this report, the 1941 figures are exclusive of persons on Active Service on June 2, 1941.

Indians on reserves

Indians living on reserves are excluded from the labour force in 1951 and from the gainfully occupied in 1921 but included in other census years except 1901 when all Indians were excluded. The comparability of certain occupations especially that of hunters and trappers may be affected by this change.

SYMBOLS

- nil or zero.
- . . figures not available.
- . . . figures not comparable with the other census years.

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1911-1961 Censuses showing the decade-to-decade percentage increase for Canada¹

No.	Occupation (as of 1961)	Canada ¹			Percentage increase — Augmentation procentuelle			Newfoundland — Terre-Neuve	
		1941	1951	1961	1941 - 1961	1941 - 1951	1951 - 1961	1951	1961
1	All occupations	4,183,357	5,276,639	6,458,156	54.4	26.1	22.4	103,411	112,310
2	Managerial occupations	236,803	429,181	538,131	127.2	77.4	28.1	6,900	8,703
	<i>Managers, specified:</i>								
3	Postmasters	4,974	5,643	6,087	22.4	13.4	7.9	367	431
4	Purchasing agents and buyers	9,496	14,012	14,732	55.1	47.9	4.9	102	141
	<i>Owners and managers, n.e.s.² (in the following industries):</i>								
5	Forestry; logging	1,416	4,535	3,472	145.2	220.3	- 23.4	160	70
6	Mines, quarries and oil wells	1,369	2,685	3,954	188.8	96.1	47.3	23	68
7	Manufacturing industries	28,523	61,649	72,261	153.3	116.1	17.2	760	512
8	Construction industry	6,766	22,554	37,305	451.4	233.3	65.4	156	303
9	Transportation, communication and other utilities	8,083	19,149	27,654	241.9	136.8	44.4	404	481
10	Trade	129,945	183,990	217,885	67.7	41.6	18.4	3,722	4,820
11	Wholesale .....	...	48,386	69,673	...	...	29.5	533	726
12	Retail .....	...	135,604	155,212	...	...	14.4	3,189	4,094
13	Finance, insurance, real estate	9,556	13,656	36,512	282.1	95.2	95.7	102	255
14	Community, business and personal service industries	24,759	62,439	33,922	239.0	152.2	34.4	600	877
15	Motion picture and recreational services	3,436	6,663	7,051	105.2	93.9	5.8	60	66
16	Personal services	21,323	41,911	47,775	124.0	93.6	14.0	350	566
17	Public administration	12,736	24,316	29,405	130.9	90.9	20.9	491	611
18	Professional and technical occupations	288,375	384,773	627,624	117.6	33.4	63.1	5,521	9,473
19	Professional engineers (incl. surveyors)	19,791	34,385	51,370	159.6	73.7	49.4	287	585
20	Civil engineers (incl. surveyors)	6,721	12,168	20,257	201.4	81.0	66.5	177	385
21	Mechanical engineers (incl. industrial)	4,518	8,323	12,091	167.6	84.3	45.2	40	81
22	Mechanical engineers .....	..	..	8,130	..	..	..	..	66
23	Industrial engineers .....	..	..	3,961	..	..	..	..	15
24	Electrical engineers	4,557	6,349	8,753	92.2	39.3	37.9	37	84
25	Chemical engineers .....	..	2,572	2,995	..	..	16.4	10	7
26	Biologists and agricultural professionals .....	..	..	5,928	..	..	..	..	60
27	Veterinarians	1,050	1,205	1,524	45.1	14.8	26.5	4	4
28	Teachers	90,588	110,039	188,796	103.4	21.5	71.5	2,515	4,318
29	Professors and college principals	4,135	5,422	11,145	169.5	31.1	105.6	18	58
30	School teachers	86,453	102,578	167,694	94.0	18.6	63.5	2,342	4,147
31	Health professionals	64,561	85,790	133,104	113.9	32.9	61.0	1,020	1,933
32	Physicians and surgeons	10,723	14,325	21,266	98.3	33.6	48.4	143	230
33	Dentists	3,740	4,603	5,463	46.1	23.2	18.6	18	42
34	Nurses, graduate	26,626	35,138	61,553	131.2	32.0	75.2	411	783
35	Nurses-in-training	11,833	15,623	22,993	93.5	31.5	47.2	269	567
36	Osteopaths and chiropractors	568	832	1,112	95.8	46.5	33.6	1	1
37	Medical and dental technicians .....	..	5,604	13,718	..	..	144.8	84	195
38	Law professionals	8,393	9,635	12,899	53.6	14.7	33.9	83	93
39	Judges and magistrates	473	597	831	73.8	24.9	39.2	20	24
40	Lawyers and notaries	7,920	9,038	12,063	52.4	14.1	33.5	63	74
41	Religion professionals	26,461	30,542	33,563	26.8	15.4	9.9	545	703
42	Clergymen and priests, n.o.r. ³	14,108	16,097	18,832	33.5	14.1	17.0	316	420
43	Nuns and brothers, n.o.r. ³	8,911	12,008	10,036	12.6	34.3	- 16.4	59	169

¹ Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

² N.e.s. = Not elsewhere specified.

³ N.o.r. = Not otherwise reported.

Note: The "Gainfully occupied" rather than the "Labour force" concept was used in 1941 for determining the labour force status (see Introduction).

The labour force figures exclude a few persons seeking work who have never been employed.

Occupations for 1941 and 1951 were rearranged on the basis of the 1961 Classification though some adjustment of the 1961 grouping was necessary.

The 1941 figures in this table exclude persons on Active Service on June 2, 1941.

TABLEAU 8. Main-d'oeuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹

Prince Edward Island Île-du-Prince-Édouard			Nova Scotia Nouvelle-Écosse			New Brunswick Nouveau-Brunswick			Profession (comme en 1961)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
31,109	34,050	34,148	199,694	220,585	236,819	140,152	168,762	174,396	Toutes professions	1
1,149	1,968	2,174	9,715	15,613	18,087	6,657	11,712	13,857	Administrateurs	2
55	54	58	485	591	545	288	351	331	Directeurs, déterminés:	3
5	36	47	95	205	322	89	207	262	Maîtres de poste	4
									Agents des colis et a. b. e.	
1	5	2	188	336	172	156	604	241	Propriétaires et directeurs, n.c.o. ² (dans les industries suivantes):	
—	—	—	133	229	127	27	48	50	Forêt, pêche, élevage	5
61	239	235	816	1,779	1,811	634	1,168	1,379	Mines, carrières et puits de pétrole	6
35	54	116	272	641	990	148	436	682	Industrie de la construction	7
27	67	89	351	695	947	230	519	836	Transports, communications et autres services d'utilité publique	8
768	1,081	1,089	5,859	7,879	8,442	3,931	5,717	6,354	Commerce	10
...	182	249	...	1,414	1,747	...	1,162	1,468	Commerce de gros	11
...	879	810	...	6,465	6,695	...	4,555	4,946	Commerce de détail	12
47	67	109	304	530	1,030	195	383	721	Finances, assurances, immobilier	13
70	261	259	689	1,832	2,250	471	1,358	1,657	Services sociaux, communautaires, industriels et personnels	14
6	18	13	118	195	197	80	166	139	Cinéma, théâtre et services récréatifs	15
64	176	165	571	1,202	1,309	391	872	947	Services personnels	16
75	123	139	536	885	1,229	458	900	1,170	Administration publique	17
1,763	1,953	2,557	11,071	14,250	21,313	8,263	16,919	16,435	Professions libérales et techniques	18
32	63	89	739	1,036	1,361	369	517	955	Ingénieurs professionnels (y compris les arpenteurs)	19
25	46	62	315	621	701	214	359	534	Ingénieurs civils (y compris les arpenteurs)	20
1	3	14	143	147	279	45	61	171	Ingénieurs mécaniciens (y compris les ingénieurs industriels)	21
..	..	13	..	..	229	..	..	125	Ingénieurs mécaniciens	22
..	..	1	..	..	50	..	..	46	Ingénieurs industriels	23
6	10	10	174	144	216	85	82	170	Ingénieurs électriques	24
..	—	1	..	21	19	..	26	21	Ingénieurs chimistes	25
..	..	60	..	..	185	..	..	169	Biologistes et spécialistes des sciences agricoles	26
11	14	16	23	25	36	27	31	35	Vétérinaires	27
811	816	1,032	4,039	5,217	7,665	3,217	4,220	6,616	Personnel enseignant	28
14	26	39	140	269	377	76	177	318	Professeurs et directeurs	29
797	739	1,008	3,939	4,883	6,922	3,201	3,721	5,963	Instituteurs	30
443	553	721	3,021	3,703	5,611	2,189	2,886	3,758	Spécialistes de la santé	31
67	73	91	426	573	703	270	357	455	Médecins et chirurgiens	32
22	28	25	146	175	171	101	111	103	Dentistes	33
203	214	322	1,328	1,552	2,611	532	1,160	1,989	Infirmeries (Général) diplômées (Gé)	34
96	150	176	756	829	1,226	373	811	606	Infirmeries infirmières (Géné)	35
1	2	2	12	18	19	12	20	16	Ostéopathes et chiropraticiens	36
..	36	51	..	215	534	..	178	352	Techniciens des soins infirmiers et dentaires	37
58	47	43	282	303	324	234	277	244	Juristes	38
7	7	7	38	29	31	35	31	31	Juges et magistrats	39
51	40	41	244	279	293	199	225	213	Avocats et notaires	40
202	195	213	1,068	1,218	1,316	942	1,166	1,272	Clergé et ministres du culte	41
139	123	139	718	740	885	603	619	779	Ministres et prêtres, n.d.a. ³	42
51	50	41	275	358	312	263	354	372	Religieux et religieuses, n.d.a. ³	43

¹ Moins le Yukon et les Territoires du Nord-Ouest; comprend Terre-Neuve en 1951 et 1961.

² N.c.o. = Non classés ailleurs.

³ N.d.a. = Non déclarés autrement.

Nota: En 1941 le concept de la "population active" plutôt que celui de la "main-d'oeuvre" servait à déterminer la situation dans la main-d'oeuvre (voir Introduction).

Les chiffres de la main-d'oeuvre ne comprennent pas quelques personnes en quête de travail qui n'ont jamais travaillé.

Les professions de 1941 et 1951 ont été remaniées d'après la classification de 1961, bien qu'il ait fallu apporter certaines rectifications de groupement de 1961.

Les chiffres de 1941 dans le présent tableau ne comprennent pas les personnes en service actif le 2 juin 1941.

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

No.	Occupation (as of 1961)	Canada ¹			Percentage increase — Augmentation procentuelle			Newfoundland — Terre-Neuve	
		1941	1951	1961	1941- 1961	1941- 1951	1951- 1961	1951	1961
Professional and technical occupations—Con.:									
1	Artists, writers and musicians	15,341	20,133	31,730	106.8	31.3	57.6	114	232
2	Artists and art teachers	3,282	4,896	7,439	126.7	49.2	51.9	9	30
3	Artists, commercial .....	..	3,786	5,161	..	..	36.3	7	18
4	Artists (except commercial), art teachers .....	..	1,110	2,278	..	..	105.2	2	12
5	Authors, editors and journalists	4,147	7,217	13,024	214.0	74.0	80.5	48	109
6	Musicians and music teachers	7,912	8,025	11,267	42.4	1.4	40.4	57	93
7	Other professionals .....	..	..	154,263	..	..	..	..	1,465
8	Architects	1,202	1,740	2,940	144.6	44.8	69.0	9	17
9	Draughtsmen	5,752	..	20,615	258.4	..	..	..	107
10	Actuaries and statisticians .....	..	1,000	2,909	..	..	190.9	6	9
11	Librarians	1,556	2,061	3,435	120.8	32.4	66.7	15	26
12	Interior decorators and window dressers	976	2,429	3,988	303.6	143.9	64.2	10	26
13	Photographers	2,706	3,593	3,702	36.8	33.0	2.9	22	26
14	Clerical occupations	314,032	573,137	833,173	165.3	84.1	41.1	6,940	9,823
15	Office appliance operators	2,993	11,001	23,371	845.3	266.9	157.9	23	92
16	Shipping and receiving clerks .....	..	48,831	56,240	..	..	15.0	329	486
17	Baggagemen and expressmen, transport	1,460	2,344	1,819	24.6	60.5	- 22.4	22	10
18	Ticket, station and express agents, transport	4,937	6,595	8,549	71.4	32.2	29.6	137	214
19	Stenographers, typists and clerk-typists	81,203	138,517	216,424	166.5	70.6	56.2	1,553	2,237
20	Stenographers .....	..	..	165,365	..	..	..	..	1,640
21	Typists and clerk-typists .....	..	..	51,059	..	..	..	..	597
22	Attendants, doctors' and dentists' offices .....	..	2,625	3,893	..	..	48.3	8	21
23	Sales occupations	206,722	286,839	410,409	93.5	33.8	43.0	5,235	7,135
24	Foremen, trade .....	..	6,848	10,500	..	..	53.3	93	82
25	Auctioneers	317	301	353	11.4	- 5.0	17.3	2	2
26	Canvassers, other door-to-door salesmen and demonstrators	7,422	7,617	14,477	95.0	2.6	90.1	36	109
27	Sales clerks (incl. service station attendants)	137,682	180,431	249,564	81.3	31.0	33.3	4,618	6,132
28	Sales clerks .....	..	172,719	229,528	..	..	32.9	4,549	5,869
29	Service station attendants .....	..	7,712	20,036	..	..	159.8	69	263
30	Advertising salesmen and agents .....	..	1,777	3,182	..	..	79.1	3	20
31	Insurance salesmen and agents	14,637	18,134	28,038	91.6	23.9	51.6	76	176
32	Real estate salesmen and agents	4,135	8,433	11,166	170.5	104.1	32.6	20	28
33	Security salesmen and brokers	3,064	3,038	5,343	74.4	0.8	73.0	5	21
34	Brokers, agents and appraisers, n.e.s. ² .....	..	3,578	5,897	..	..	64.8	32	58
35	Service and recreation occupations	435,053	514,412	794,115	82.5	13.2	51.4	10,497	13,212
36	Protective service occupations	41,903	125,924	195,035	365.4	200.5	54.9	1,853	3,186
37	Firemen, fire protection	4,975	8,873	14,266	186.8	78.4	60.7	257	472
38	Policemen and detectives	16,070	20,074	30,007	86.7	24.9	40.5	405	556
39	Guards, watchmen, n.e.s. ²	20,358	25,732	34,895	67.3	23.4	35.6	484	613
40	Housekeepers, waiters, cooks and related workers	303,249	262,947	395,961	23.4	- 14.7	50.6	6,857	7,541
41	Housekeepers (except private household), matrons, stewards	7,279	10,162	16,200	122.6	39.6	59.4	299	331
42	Cooks	27,767	35,163	49,561	78.5	26.6	40.9	1,093	1,073
43	Waiters, waitresses and bartenders	36,635	60,907	87,967	140.1	66.2	44.4	913	1,109
44	Waiters and waitresses .....	..	..	78,580	..	..	..	..	902
45	Bartenders .....	..	..	9,337	..	..	..	..	207
46	Nursing assistants and aides	11,227	25,459	62,432	456.1	126.8	145.2	528	1,110
47	Porters, baggage and pullman	5,112	5,777	5,169	1.1	13.0	- 10.5	38	48
48	Baby sitters, maids and related service workers, n.e.s. ²	196,903	117,945	143,954	- 21.4	- 40.1	26.3	3,731	3,367
49	Baby sitters .....	..	..	12,516	..	..	..	..	58
50	Maids and related service workers, n.e.s. ² .....	..	..	136,438	..	..	..	..	3,309

TABLEAU 2. Main-d'œuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹ — suite

Prince Edward Island Île-du-Prince-Édouard			Nova Scotia Nouvelle-Écosse			New Brunswick Nouveau-Brunswick			Profession (comme en 1961)	N°
1911	1951	1961	1941	1951	1961	1941	1951	1961		
									Professions libérales et techniciens — fin:	
61	93	95	469	568	838	259	328	483	Artistes, écrivains et musiciens	1
7	10	8	67	80	110	36	41	55	Artistes et professeurs d'art	2
..	4	..	..	41	59	..	32	24	Dessinateurs publicitaires	3
..	6	8	..	36	51	..	9	31	Artistes (sauf publicité) et professeurs d'art	4
17	33	43	126	172	327	75	130	207	Écrivains, rédacteurs et journalistes	5
40	50	44	276	316	401	148	157	221	Musiciens et professeurs de musique	6
..	..	290	..	..	3,785	..	..	2,767	Autres professions libérales	7
4	1	6	24	29	50	13	22	34	Architectes	8
2	..	14	97	..	453	57	..	314	Dessinateurs	9
..	..	..	..	10	34	..	10	35	Actuaires et statisticiens	10
12	15	15	43	80	123	28	28	60	Bibliothécaires	11
3	5	12	19	49	106	17	38	70	Décorateurs — ensembliers et étalagistes	12
6	11	6	120	123	82	67	63	53	Photographes	13
877	1,789	2,344	10,410	17,896	23,957	7,608	14,605	18,293	Employés de bureau	14
—	2	11	24	131	447	16	104	354	Mécanographes	15
..	104	130	..	1,228	1,399	..	934	1,078	Commis d'expédition et de réception	16
6	10	6	71	107	75	68	86	75	Commis aux bagages et messagerie, transports	17
44	50	53	232	303	347	163	243	267	Agents (billets, stations, messagerie), transports	18
279	451	504	2,928	4,214	6,334	2,327	3,396	4,961	Sténographes, dactylographes et commis-dactylographes	19
..	..	510	..	..	5,219	..	..	4,141	Sténographes	20
..	..	54	..	..	1,115	..	..	820	Dactylographes et commis-dactylographes	21
..	9	8	..	73	81	..	27	46	Assistants, bureau de médecin et de dentiste	22
1,100	1,481	1,733	8,803	11,337	14,623	6,060	8,351	10,871	Vendeurs	23
...	18	14	...	229	222	...	160	202	Contremaîtres, commerce	24
3	2	..	6	3	3	5	1	4	Vendeurs à l'enchère	25
41	37	57	281	340	624	163	221	408	Solliciteurs, autres vendeurs à domicile et démonstrateurs	26
920	1,180	1,381	6,762	8,234	10,511	4,678	6,044	7,986	Commis-vendeurs [y compris pompistes (poste d'essence)]	27
..	1,145	1,271	..	7,829	9,669	..	5,817	7,261	Commis-vendeurs	28
..	35	110	..	405	842	..	227	722	Pompistes (postes d'essence)	29
..	1	9	..	37	78	..	24	46	Publicitaires	30
40	53	71	468	572	822	326	433	586	Agents et vendeurs d'assurances	31
2	6	4	59	70	116	44	51	42	Agents et vendeurs d'immeubles	32
3	5	9	47	69	120	56	45	68	Courtiers et négociants en valeurs	33
..	7	17	..	77	140	..	67	113	Courtiers, agents et estimateurs, n.c.a. ²	34
2,888	3,573	4,213	21,838	30,237	43,947	15,766	16,165	26,221	Travailleurs des services et des activités récréatives	35
125	1,151	1,338	1,575	12,732	21,982	1,255	3,409	9,480	Travailleurs des services de protection	36
3	6	24	134	309	683	66	195	437	Pompiers	37
65	83	122	671	814	1,054	508	617	821	Policiers et détectives	38
57	60	91	770	1,162	1,345	681	768	965	Gardiens, veilleurs, n.c.a. ²	39
2,419	1,802	2,092	17,477	13,113	15,753	12,452	9,607	12,103	Intendants, garçons de table, cuisiniers et travailleurs assimilés	40
27	60	100	404	380	695	175	237	401	Intendants (sauf maison privée), gouvernantes, stewards	41
78	157	221	1,159	1,366	1,594	918	1,181	1,361	Cuisiniers	42
129	314	343	1,314	1,852	2,412	727	1,117	1,581	Garçons et filles de table, barmen	43
..	..	336	..	..	2,330	..	..	1,540	Garçons et filles de table	44
..	..	7	..	..	82	..	..	41	Barmen	45
44	83	325	438	692	1,951	313	734	2,117	Assistants infirmiers et aides-infirmiers	46
14	38	23	278	326	272	123	203	185	Porteurs, hommes et femmes	47
2,017	1,078	960	12,984	8,008	8,021	9,621	5,857	5,970	Gardiens d'enfants, femmes et valets de chambre et travailleurs assimilés, n.c.a. ²	48
..	..	17	..	..	373	..	..	166	Gardiens d'enfants	49
..	..	913	..	..	7,648	..	..	5,804	Femmes et valets de chambre et travailleurs assimilés, n.c.a. ²	50

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

No.	Occupation (as of 1961)	Canada ¹			Percentage Increase - Augmentation procentuelle			Newfoundland - Terre-Neuve	
		1941	1951	1961	1941- 1961	1941- 1951	1951- 1961	1951	1961
	Service and recreation occupations - Con.:								
1	Athletes, entertainers and related workers	2,072	3,714	6,462	211.9	79.2	74.0	11	27
2	Actors, entertainers and showmen .....	..	..	2,730	..	..	..	..	5
3	Athletes and sports officials .....	..	..	3,732	..	..	..	..	22
4	Other service occupations	82,829	121,827	196,657	137.4	47.1	61.4	1,686	2,458
5	Barbers, hairdressers; manicurists	25,880	24,411	42,114	62.7	- 5.7	72.5	265	371
6	Launderers and dry cleaners	17,847	26,862	31,582	77.0	50.5	17.6	432	539
7	Elevator tenders, building	3,925	5,264	5,269	34.2	34.1	0.1	30	43
8	Janitors and cleaners, building	28,830	51,331	100,893	274.3	90.3	53.7	750	1,350
9	Funeral directors and embalmers	2,147	2,300	2,699	25.7	7.1	17.3	18	25
10	Guides .....	..	2,127	2,952	..	..	38.8	15	28
11	Transport and communication occupations	214,112	330,899	391,569	82.9	54.5	18.3	7,724	9,024
12	Air pilots, navigators and flight engineers	571	1,141	2,695	372.0	99.8	136.2	6	39
13	Operators, railroad	28,413	38,249	28,223	- 0.7	34.6	- 26.2	476	519
14	Locomotive engineers	7,038	9,366	7,573	6.8	32.1	- 19.1	136	143
15	Locomotive firemen	5,235	7,254	3,744	- 28.5	33.6	- 48.4	119	65
16	Conductors, railroad	4,229	6,364	5,725	35.4	50.5	- 10.0	63	78
17	Brakemen, switchmen and signalmen	11,861	15,265	11,186	- 5.7	23.7	- 26.7	158	233
18	Operators, water transport	13,915	17,157	17,424	25.2	23.3	1.6	2,104	1,661
19	Deck and engineering officers, ship	5,937	7,837	8,135	37.0	32.0	3.8	863	826
20	Deck ratings (ship), barge crews and boatmen .....	..	7,459	7,520	..	..	0.8	1,133	734
21	Engine-room ratings, firemen and oilers, ship	1,450	1,861	1,769	22.0	28.3	- 4.9	108	101
22	Operators, road transport	106,096	183,176	252,960	138.4	72.6	38.1	3,240	4,909
23	Bus drivers	2,867	11,451	18,611	527.3	285.9	62.5	251	275
24	Taxi drivers and chauffeurs	12,344	21,354	22,071	78.8	73.0	3.4	662	653
25	Other transport occupations .....	..	..	4,425	..	..	..	..	253
26	Operators, electric street railway	6,544	6,226	1,342	- 79.5	- 4.9	- 78.4	-	1
27	Other communication occupations .....	..	..	65,169	..	..	..	..	1,357
28	Radio and television announcers	411	1,015	1,634	297.6	147.0	61.0	24	49
29	Telephone operators	13,787	30,660	35,392	156.7	122.4	15.4	322	434
30	Telegraph operators	5,360	6,624	4,375	- 18.4	23.6	- 34.0	224	212
31	Postmen and mail carriers	7,410	9,042	13,435	81.3	22.0	48.6	113	155
32	Farmers and farm workers	1,074,991	823,693	643,910	- 39.6	- 23.2	- 21.4	3,663	1,684
33	Farmers and stockraisers	644,310	545,677	393,394	- 39.0	- 15.3	- 27.9	2,446	830
34	Farm managers and foremen	3,071	3,906	3,341	8.8	27.2	- 14.5	34	28
35	Farm labourers .....	..	258,119	222,301	..	..	- 13.9	928	603
36	Gardeners (except farm), groundskeepers and other agricultural occupations .....	..	18,391	29,871	..	..	62.4	260	228
37	Gardeners (exc. farm) and groundskeepers .....	..	..	24,727	..	..	..	..	203
38	Other agricultural occupations .....	..	..	5,144	..	..	..	..	20
39	Loggers and related workers	73,710	109,854	76,674	0.2	23.1	- 21.3	9,151	5,748
40	Forest rangers and cruisers .....	..	4,715	7,561	..	..	60.4	133	180
41	Fishermen, trappers and hunters ²	51,312	51,023	34,267	- 33.2	- 0.6	- 32.8	13,346	8,193
42	Fishermen ²	33,289	45,520	31,807	- 4.4	39.7	- 31.6	18,033	8,182
43	Trappers and hunters ² .....	..	4,563	2,460	..	..	- 45.4	203	1
44	Miners, quarrymen and related workers	69,561	64,669	64,021	- 3.0	- 7.1	- 1.0	2,221	2,213
45	Prospectors .....	..	923	807	..	..	- 12.6	18	7

¹ Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

² The 1951 figures do not include Indians living on reserves (see Introduction).

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1911-1961 Censuses showing the decade-to-decade percentage increase for Canada¹—Continued

No.	Occupation (as of 1961)	Canada ¹			Percentage increase — Augmentation procentuelle			Newfoundland — Terre-Neuve	
		1941	1951	1961	1941- 1961	1941- 1951	1951- 1961	1951	1961
1	Craftsmen, production process and related workers	936,292	1,303,559	1,527,129	63.1	39.2	17.2	29,637	24,262
2	Millers, bakers, brewers and related food workers .....	..	..	76,215	..	..	..	..	2,311
3	Millers of flour and grain	2,550	2,106	2,244	- 12.0	- 17.4	6.6	2	—
4	Fruit and vegetable canners and packers .....	..	2,022	3,566	..	..	76.4	3	3
5	Tire builders, vulcanizers and other rubber workers ....	..	..	10,673	..	..	..	..	20
6	Tire and tube builders .....	..	4,143	2,728	..	..	- 34.2	—	1
7	Vulcanizers .....	..	1,691	2,410	..	..	42.5	3	19
8	Leather cutters, lasters, sewers and other leather workers (except glove and garment)	25,869	22,429	23,774	- 8.1	- 13.3	6.0	94	90
9	Leather cutters .....	..	2,751	2,699	..	..	- 1.9	—	8
10	Shoemakers and repairers—factory, n.e.s. ² .....	..	10,114	12,305	..	..	26.6	8	31
11	Shoemakers and repairers—not in factory	8,018	5,875	4,373	- 39.2	- 23.7	- 17.1	60	42
12	Spinners, weavers, knitters and related workers .....	..	..	33,800	..	..	..	..	64
13	Weavers	9,482	8,997	4,518	- 52.4	- 5.1	- 49.8	21	1
14	Tailors, furriers, upholsterers and related workers	80,096	104,317	107,561	34.3	30.2	3.1	476	322
15	Dressmakers and seamstresses—not in factory	10,872	14,226	16,137	48.9	30.8	13.8	157	144
16	Upholsterers	3,609	5,115	5,723	53.6	41.7	11.9	21	27
17	Carpenters, cabinetmakers, sawyers and related workers .....	..	..	172,252	..	..	..	..	5,049
18	Carpenters	91,123	129,034	121,799	33.7	41.6	- 5.6	4,573	4,237
19	Sawyers	8,230	13,280	13,267	61.2	61.4	- 0.1	346	532
20	Inspectors, graders, scalers—log and lumber	3,557	5,265	6,503	82.8	48.0	23.5	120	82
21	Printers, bookbinders and related workers	22,935	30,350	37,988	65.6	32.3	25.2	232	247
22	Compositors and typesetters .....	..	15,244	16,316	..	..	7.0	154	169
23	Photoengravers, pressmen—printing, lithographic and photo-offset occupations .....	..	8,181	13,085	..	..	59.9	26	38
24	Pressmen, printing .....	..	..	8,863	..	..	..	..	37
25	Lithographic and photo-offset occupations .....	..	..	3,059	..	..	..	..	1
26	Photoengravers .....	..	..	1,163	..	..	..	..	—
27	Bookbinders .....	..	3,216	3,978	..	..	23.7	34	76
28	Other occupations in bookbinding .....	..	1,535	1,911	..	..	20.6	10	9
29	Printing workers, n.e.s. ² .....	..	2,124	2,698	..	..	27.0	8	5
30	Furnacemen, moulders, blacksmiths and related metal workers .....	..	..	31,989	..	..	..	..	118
31	Heat treaters, annealers, temperers	506	762	1,042	105.9	50.6	36.7	2	1
32	Rolling mill operators .....	..	1,702	2,254	..	..	32.4	—	1
33	Blacksmiths, hammermen, forgers	15,110	9,555	5,124	- 66.1	- 36.6	- 43.5	175	66
34	Coremakers .....	..	2,087	985	..	..	- 52.8	1	3
35	Jewellers, watchmakers and engravers .....	..	..	5,939	..	..	..	..	43
36	Engravers, except photoengravers .....	..	929	950	..	..	2.3	—	3
37	Machinists, plumbers, sheet metal workers and related workers .....	..	..	224,760	..	..	..	..	1,898
38	Toolmakers, die-makers	7,049	9,443	10,606	50.5	34.0	12.3	1	2
39	Files, grinders, sharpeners	4,800	6,902	5,911	23.1	43.8	- 14.4	79	24
40	Millwrights	4,744	8,055	9,778	106.1	69.8	21.4	132	191
41	Fitters and assemblers, n.e.s. ² —metal .....	..	16,543	17,603	..	..	6.4	19	15
42	Plumbers and pipefitters	19,476	29,573	37,431	92.4	51.6	26.9	501	623
43	Sheet metal workers .....	..	13,749	17,089	..	..	24.3	174	180
44	Riveters and rivet heaters .....	..	2,100	1,401	..	..	- 33.1	11	1
45	Boilermakers, platers and structural metal workers .....	..	6,417	8,530	..	..	32.9	162	193
46	Welders and flame cutters	12,134	23,643	38,674	213.7	94.9	63.5	134	314
47	Polishers and buffers—metal	3,300	3,812	2,797	- 15.2	15.5	- 26.6	1	1

For footnotes 1 and 2, see page 8-1.

TABLEAU 8. Main-d'œuvre (âge de 15 ans et plus selon la division professionnelle et principales branches et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹ — suite

Prince Edward Island Île-du-Prince-Édouard			Nova Scotia Nouvelle-Écosse			New Brunswick Nouveau-Brunswick			Profession (comme en 1961)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
2,659	4,439	5,343	34,992	44,170	48,371	23,500	32,884	36,492	Ouvriers de métaux, artisans, ouvriers à la production et travailleurs assimilés.	1
..	..	1,037	..	..	4,654	..	..	3,864	Meuniers, boulangers, brasseurs et autres travailleurs de la production d'aliments.	2
40	20	29	19	13	14	34	15	17	Meuniers de farine et de grains	3
..	7	9	..	74	97	..	17	54	Conservateurs de fruits et légumes	4
..	..	11	..	..	63	..	..	60	Confectionneurs de pneus, vulcanisateurs et autres travailleurs du caoutchouc.	5
..	..	1	..	1	6	..	..	2	Confectionneurs de pneus et de chambres à air	6
..	6	10	..	48	55	..	32	55	Vulcanisateurs	7
50	34	20	377	297	204	428	381	311	Coupeurs, monteurs, couseurs et autres travailleurs du cuir (sauf gants et vêtements).	8
..	..	1	..	10	5	..	38	32	Coupeurs de cuir	9
..	1	..	..	31	7	..	148	156	Cordonniers et réparateurs — manif., n.c.a. ²	10
41	28	16	289	204	144	240	173	115	Cordonniers et réparateurs — sauf manif.	11
..	..	15	..	..	636	..	..	247	Filcurs, tisseurs, tricoteurs et travailleurs assimilés	12
1	4	3	107	133	97	160	197	78	Tisseurs	13
126	131	110	1,350	1,331	1,496	855	776	766	Tailleurs, fourreurs, rembourreurs et travailleurs assimilés	14
50	69	71	353	433	521	327	393	393	Couturiers et ouvrières-couturières — sauf manufacture ...	15
8	10	6	35	71	88	38	58	63	Rembourreurs	16
..	..	1,005	..	..	7,568	..	..	5,961	Menuisiers, ébénistes, scieurs et travailleurs assimilés	17
677	893	924	6,563	6,543	6,167	3,554	4,615	4,660	Charpentiers-menuisiers	18
63	37	48	683	771	670	670	655	545	Scieurs	19
..	3	4	95	139	130	320	307	261	Inspecteurs, trieurs et toiseurs — billes et bois d'œuvre	20
76	70	81	499	568	636	321	387	507	Imprimeurs, relieurs et travailleurs assimilés	21
..	54	58	..	376	396	..	259	293	Compositeurs et typographes	22
..	9	12	..	115	180	..	69	125	Photograpeurs, conducteurs de presses d'impression, travailleurs de la lithographie et du photo-offset.	23
..	..	11	..	..	139	..	..	103	Conducteurs de presses d'impression	24
..	..	1	..	..	17	..	..	16	Travailleurs de la lithographie et du photo-offset	25
..	..	..	..	..	24	..	..	6	Photograpeurs	26
..	3	6	..	40	49	..	33	42	Relieurs	27
..	..	..	..	9	22	..	13	29	Autres travailleurs de la reliure	28
..	4	5	..	28	40	..	13	18	Autres travailleurs de l'imprimerie, n.c.a. ²	29
..	..	39	..	..	1,205	..	..	404	Conducteurs de four, mouleurs, forgerons et travailleurs assimilés des métaux.	30
..	..	..	4	8	13	4	..	2	Traiteurs thermiques, reculseurs, trempoirs	31
..	..	..	..	151	151	..	1	4	Conducteurs de laminoirs	32
159	103	29	868	487	235	565	374	151	Forgerons, marteleurs et ouvriers de forge	33
..	1	1	..	33	11	..	26	30	Noyaux	34
..	..	8	..	..	122	..	..	85	Bijoutiers, horlogers et graveurs en joaillerie	35
..	..	..	..	14	12	..	5	4	Graveurs (sauf photograpeurs)	36
..	..	269	..	..	5,978	..	..	3,974	Machinistes, plombiers, tôliers et travailleurs assimilés	37
..	1	..	34	42	87	21	18	21	Outilleurs, marteleurs	38
..	2	1	48	80	48	139	90	98	Limeurs, aligateurs et affûteurs	39
2	3	..	129	165	217	203	293	403	Mécaniciens-ajusteurs	40
..	3	3	..	288	332	..	168	135	Ajusteurs et monteurs, n.c.a. ² — métaux	41
66	123	138	1,064	1,272	1,367	517	664	1,024	Plombiers et tuyautiers	42
..	27	21	..	285	450	..	225	269	Tôliers	43
..	2	..	..	179	67	..	25	18	Riveurs et chauffeurs de rivets	44
..	5	11	..	385	645	..	318	335	Chaudronniers, blindeurs et charpentiers en fer	45
7	22	50	339	676	1,051	133	341	794	Soudeurs et découpeurs au chalumeau	46
..	..	..	11	12	3	41	19	15	Polisseurs et meuleurs — métaux	47

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1911-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

No.	Occupation (as of 1961)	Canada ¹			Percentage increase Augmentation pourcentuelle			Newfoundland Terre-Neuve	
		1911	1951	1961	1941- 1961	1941- 1951	1951- 1961	1951	1961
	Craftsmen, production process and related workers - Con.:								
1	Mechanics and repairmen, electricians and related electrical and electronics workers.	110,195	213,225	290,796	163.9	93.5	36.4	3,022	4,913
2	Mechanics and repairmen, aircraft .....	..	3,925	6,787	..	..	72.9	122	170
3	Mechanics and repairmen, motor vehicle .....	..	64,324	88,979	..	..	38.3	872	1,528
4	Mechanics and repairmen, railroad equipment .....	..	9,308	7,088	..	..	- 23.8	166	145
5	Power station operators	2,328	3,888	4,926	111.6	67.0	26.7	152	241
6	Projectionists, motion picture	1,536	1,944	1,392	- 9.4	26.6	- 28.4	30	27
7	Linemen and servicemen—telephone, telegraph and power.	..	19,459	28,351	..	..	45.7	353	783
8	Fitters and assemblers—electrical and electronics equipment; electrical and electronics workers, n.e.s. ²	..	17,412	18,835	..	..	8.2	5	13
9	Fitters and assemblers—electrical and electron- ics equipment.	..	..	15,392	..	..	..	..	10
10	Electrical and electronics workers, n.e.s. ² .....	..	..	3,443	..	..	..	..	3
11	Painters, paperhangers and glaziers	39,345	47,148	51,235	30.2	19.8	8.7	706	856
12	Bricklayers, plasterers and construction workers, n.e.s. ²	22,471	48,800	75,036	234.1	117.2	53.9	588	1,002
13	General foremen—construction	4,032	11,569	18,249	352.6	186.9	57.7	237	427
14	Inspectors—construction	449	1,617	3,879	763.9	260.1	139.9	18	63
15	Bricklayers, stonemasons, tilers, cement and concrete finishers.	..	18,786	27,049	..	..	44.0	199	301
16	Bricklayers, stonemasons, tilers .....	..	..	20,784	..	..	..	..	233
17	Cement and concrete finishers .....	..	..	6,265	..	..	..	..	68
18	Plasterers and lathers	4,667	9,270	10,042	115.2	98.6	8.3	27	50
19	Clay, glass and stone workers .....	..	..	12,463	..	..	..	..	56
20	Lens grinders and polishers; opticians .....	..	1,527	1,725	..	..	13.0	10	15
21	Furnacemen and kilnmen, ceramics and glass .....	..	1,005	1,180	..	..	17.3	1	4
22	Stone cutters and dressers	1,891	1,366	1,715	- 9.3	0.3	- 9.6	19	14
23	Stationary engine and excavating and lifting equipment operators and related workers.	..	..	120,007	..	..	..	..	3,201
24	Boiler firemen (except ship)	8,186	11,027	6,702	- 18.1	34.7	- 39.2	424	241
25	Stationary engineers .....	..	25,583	29,302	..	..	14.5	372	667
26	Motormen (vehicle), except railway .....	..	2,091	2,380	..	..	13.8	59	91
27	Hoistmen, crane men, derrickmen, operators of earth- moving and other construction machinery, n.e.s. ²	..	21,603	46,536	..	..	115.4	416	1,318
28	Hoistmen, crane men, derrickmen .....	..	..	14,973	..	..	..	..	331
29	Operators of earth-moving and other construction machinery, n.e.s. ²	..	..	31,558	..	..	..	..	987
30	Longshoremen and stevedores	10,925	10,634	12,259	12.2	- 2.7	15.3	1,696	1,488
31	Sectionmen and trackmen	24,419	30,352	23,175	- 5.1	24.3	- 23.6	775	617
32	Other production process and related occupations .....	..	..	177,454	..	..	..	..	1,126
33	Tobacco preparers and products makers	3,703	3,697	4,071	9.9	- 0.2	10.1	50	-
34	Patternmakers (except paper)	1,721	2,311	1,975	14.8	34.3	- 14.5	12	6
35	Paper products makers .....	..	7,903	9,970	..	..	24.6	23	17
36	Photographic processing occupations .....	..	1,682	3,056	..	..	81.7	20	18
37	Inspectors, examiners, gangers, n.e.s. ² —metal .....	..	12,890	14,602	..	..	13.5	8	21
38	Inspectors, graders and samplers, n.e.s. ² .....	..	3,707	4,438	..	..	19.7	30	52
39	Labourers ³ (incl. warehousemen and freight handlers, n.e.s. ²)	266,251	351,263	344,423	29.4	31.9	- 1.9	8,577	9,020
40	Labourers ³ .....	..	..	314,122	..	..	..	..	7,665
41	Warehousemen and freight handlers, n.e.s. ² .....	..	..	30,311	..	..	..	..	1,355
42	Occupation not stated	11,397	63,940	165,501	1,352.1	461.1	158.3	1,034	3,814

For footnotes 1 and 2, see page 8-1.

³ See "Introduction".

TABLEAU 8. Main-d'œuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹ - suite

Prince Edward Island Île-du-Prince-Édouard			Nova Scotia Nouvelle-Écosse			New Brunswick Nouveau-Brunswick			Profession (comme en 1931)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
411	786	1,055	4,458	7,210	9,826	2,633	5,096	7,020	Ouvriers de métiers, artisans, ouvriers à la production et travailleurs assimilés - fin:	
..	19	14	..	82	207	..	21	56	Mécaniciens et réparateurs, électriciens et travailleurs assimilés de l'électricité et de l'électronique.	1
..	397	509	..	2,427	3,093	..	2,033	2,697	Mécaniciens et réparateurs d'avions	2
..	12	17	..	152	143	..	578	444	Mécaniciens et réparateurs d'automobiles	3
4	15	10	136	226	178	48	115	125	Mécaniciens et réparateurs de matériel de chemin de fer	4
5	10	3	54	85	49	39	56	34	Opérateurs de centrales électriques	5
...	101	101	...	1,035	1,183	...	649	822	Projectionnistes de cinéma	6
..	..	3	..	32	138	..	17	61	Monteurs et réparateurs de lignes téléphoniques, télégraphiques et électriques.	7
..	..	1	..	..	124	..	..	51	Ajusteurs et monteurs - matériel électrique et électronique; travailleurs en électricité et électronique, n.c.a. ²	8
..	..	2	..	..	14	..	..	10	Ajusteurs et monteurs - matériel électrique et électronique.	9
166	257	312	1,512	1,902	2,151	977	1,227	1,363	Travailleurs en électricité et électronique, n.c.a. ²	10
55	163	239	1,095	1,942	2,349	508	1,180	1,577	Peintres, tapissiers et vitriers	11
10	70	103	349	802	858	125	465	603	Briqueurs, plâtriers et ouvriers de la construction, n.c.a. ²	12
1	8	24	11	86	122	9	42	92	Contremaîtres de la construction	13
..	50	67	..	695	748	..	462	566	Inspecteurs de la construction	14
...	...	56	...	...	595	...	...	495	Briqueurs, maçons, carreleurs et finisseurs en béton	15
12	20	20	105	182	197	23	66	75	Briqueurs, maçons, carreleurs	16
..	..	19	..	..	240	..	..	162	Finisseurs en béton	17
..	5	7	..	39	52	..	31	37	Plâtriers et poseurs de lattes	18
..	..	..	..	52	37	..	23	14	Travailleurs de l'argile, du verre et de la pierre	19
10	11	8	88	106	52	99	69	43	Rodeurs et polisseurs de lentilles; opticiens	20
..	..	440	..	..	4,754	..	..	3,770	Chaudfleurs de four de céramique et de verrerie	21
53	102	66	638	1,111	631	241	513	257	Taillieurs et dresseurs de pierre	22
...	43	59	...	844	937	...	630	849	Conducteurs de machines fixes, d'appareils d'excavation et de levage et travailleurs assimilés.	23
..	..	3	..	213	165	..	10	12	Chaudfleurs de chaudière (sauf navire)	24
..	134	261	..	1,248	2,056	..	683	1,645	Conducteurs de machines fixes	25
..	...	21	..	...	640	..	...	392	Garde-moteurs (véhicule), sauf chemin de fer	26
..	..	240	..	..	1,416	..	..	1,253	Conducteurs de treuils, de grues et de derricks, conducteurs de machines de terrassement et de construction, n.c.a. ²	27
35	40	44	1,730	1,224	1,529	1,631	1,074	704	Conducteurs de treuils, de grues et de derricks	28
144	208	118	940	1,352	741	1,252	1,678	1,093	Conducteurs de machines de terrassement et de construction, n.c.a. ²	29
..	..	502	..	..	3,670	..	..	3,182	Débardeurs et arrimeurs	30
6	10	8	1	..	..	..	..	1	Contonniers et poseurs de rails	31
2	1	..	55	65	61	42	37	25	Autres ouvriers à la production et travailleurs assimilés	32
..	1	2	..	65	114	..	84	141	Travailleurs du tabac et des produits du tabac	33
..	5	8	..	46	66	..	29	40	Patronniers (sauf papier)	34
..	4	5	..	152	211	..	75	97	Travailleurs des articles en papier	35
..	124	223	..	144	164	..	155	151	Travailleurs des procédés photographiques	36
1,185	1,551	1,578	13,893	17,034	14,930	10,958	13,433	12,942	Inspecteurs, examinateurs, calibreurs, n.c.a. ² - métaux	37
..	..	1,388	..	..	13,409	..	..	11,433	Inspecteurs, classeurs, échantillonneurs, n.c.a. ²	38
..	..	190	..	..	1,521	..	..	1,509	Manœuvres ³ (y compris les ouvriers de l'entreposage et de la manutention, n.c.a. ²).	39
32	300	765	387	3,234	4,667	284	2,683	4,171	Manœuvres ³	40
									Ouvriers de l'entreposage et de la manutention, n.c.a. ²	41
									Professions non déclarées	42

¹ Pour renvois 1 et 2, voir page 8-2.

² Voir "Introduction".

TABLE 3. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

No.	Occupation (as of 1961)	Quebec Québec			Ontario			Manitoba		
		1941	1951	1961	1941	1951	1961	1941	1951	1961
1	All occupations	1,181,601	1,467,237	1,768,119	1,452,071	1,832,593	2,393,015	261,944	293,034	342,612
2	Managerial occupations	62,786	109,833	133,633	87,349	159,772	209,532	14,959	22,733	25,663
3	Managers, specified:									
4	Postmasters	1,110	1,180	1,365	1,022	1,093	1,207	342	338	348
4	Purchasing agents and buyers	1,007	2,330	3,744	2,110	4,142	6,652	904	1,134	662
	Owners and managers, n.e.s. ² (in the following industries):									
5	Forestry; logging	419	1,390	805	212	713	583	14	74	34
6	Mines, quarries and oil wells	178	365	552	467	753	1,053	60	81	122
7	Manufacturing industries	8,862	19,713	22,349	13,270	26,983	32,388	1,162	2,303	2,629
8	Construction industry	1,791	5,217	8,744	3,055	10,538	15,257	405	1,142	1,733
9	Transportation, communication and other utilities	1,821	4,447	6,768	3,057	7,315	9,384	624	1,195	1,730
10	Trade	34,175	46,225	54,886	47,434	67,103	80,324	8,545	10,739	11,333
11	Wholesale .....	...	11,846	14,785	...	17,515	23,759	...	3,776	4,119
12	Retail .....	...	34,379	40,101	...	49,588	56,565	...	6,963	7,219
13	Finance, insurance, real estate	2,508	4,891	9,745	4,061	7,961	14,592	661	1,121	1,795
14	Community, business and personal service industries	8,127	17,574	22,038	8,038	23,053	32,775	1,333	3,292	3,806
15	Motion picture and recreational services	607	1,325	1,620	1,424	2,719	2,845	272	435	365
16	Personal services	7,520	13,079	13,162	6,614	14,772	17,624	1,081	1,979	2,160
17	Public administration	3,362	6,172	5,860	4,659	10,007	13,262	865	1,304	1,218
18	Professional and technical occupations	93,223	114,633	179,703	102,237	141,407	237,637	16,539	19,034	29,323
19	Professional engineers (incl. surveyors)	5,923	8,990	13,853	8,816	16,472	22,873	945	1,109	1,739
20	Civil engineers (incl. surveyors)	2,039	2,881	4,698	2,500	4,205	7,392	387	582	964
21	Mechanical engineers (incl. industrial)	1,569	2,340	3,533	2,100	4,929	6,385	203	146	258
22	Mechanical engineers .....	..	..	2,468	..	..	4,075	..	..	184
23	Industrial engineers .....	..	..	1,085	..	..	2,310	..	..	74
24	Electrical engineers	1,306	1,732	2,834	2,182	3,551	4,205	205	188	277
25	Chemical engineers .....	..	753	817	..	1,358	1,584	..	37	21
26	Biologists and agricultural professionals .....	..	..	1,365	..	..	1,959	..	..	416
27	Veterinarians	217	203	305	470	591	633	89	72	96
28	Teachers	31,937	37,523	59,500	25,588	31,234	59,577	5,228	5,946	9,570
29	Professors and college principals	2,266	2,631	5,192	1,051	1,424	3,052	121	250	421
30	School teachers	29,671	34,402	49,583	24,537	29,193	54,147	5,107	5,693	8,774
31	Health professionals	11,276	19,091	32,763	26,659	32,337	52,621	4,229	4,763	7,309
32	Physicians and surgeons	3,162	4,097	6,187	4,197	5,363	8,040	659	833	1,120
33	Dentists	868	1,032	1,203	1,633	1,906	2,239	210	247	251
34	Nurses, graduate	6,088	7,335	12,541	11,007	13,693	24,579	1,465	1,660	3,025
35	Nurses-in-training	1,974	3,429	6,426	4,619	5,042	7,538	1,100	897	1,293
36	Osteopaths and chiropractors	48	100	240	294	427	495	51	41	44
37	Medical and dental technicians .....	..	1,291	3,447	..	1,851	4,637	..	432	950
38	Law professionals	2,672	2,797	3,503	2,981	3,504	5,184	556	571	654
39	Judges and magistrates	85	128	181	164	196	282	32	30	38
40	Lawyers and notaries	2,587	2,669	3,322	2,817	3,388	4,902	524	541	616
41	Religion professionals	11,697	14,128	13,784	6,587	7,339	9,339	1,313	1,297	1,311
42	Clergymen and priests, n.o.r. ³	4,108	4,919	5,372	4,677	5,132	6,195	754	852	952
43	Nuns and brothers, n.o.r. ³	6,583	8,935	6,305	788	1,334	2,002	351	278	163

For footnotes 1, 2 and 3, see page 8-1.

TABLEAU 8. Main-d'œuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹ — suite

Saskatchewan			Alberta			British Columbia Colombie-Britannique			Profession (comme en 1961)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
315,504	301,645	325,589	287,631	353,497	489,511	313,687	443,800	577,643	Toutes professions.....	1
17,550	22,798	23,318	16,047	28,350	41,601	20,609	40,497	57,023	Administrateurs	2
761	756	747	526	553	544	365	357	461	Directeurs, déterminés:	
2,993	2,876	348	1,889	2,104	967	404	903	1,367	Maîtres de poste	3
									Agents des achats et acheteurs	4
									Propriétaires et directeurs, n.c.a. ² (dans les industries suivantes):	
18	28	26	16	99	95	394	1,126	1,444	Forestage, abattage.....	5
47	83	180	266	805	1,415	191	292	362	Mines, carrières et puits de pétrole.....	6
652	961	1,118	910	2,030	3,012	2,156	5,703	6,828	Industrie manufacturière.....	7
220	680	1,526	291	1,731	3,842	549	1,959	4,109	Industrie de la construction	8
577	1,014	1,387	568	1,335	2,656	833	2,158	3,356	Transports, communications et autres services d'utilité publique.....	9
8,956	11,090	11,364	8,532	13,136	17,516	11,695	17,318	21,752	Commerce.....	10
...	3,188	3,328	...	4,087	5,911	...	4,633	6,641	Commerce de gros	11
...	7,902	8,036	...	9,049	11,605	...	12,635	15,111	Commerce de détail	12
548	700	1,267	523	1,191	2,884	708	1,710	4,114	Finances, assurances, immeuble	13
1,954	3,349	3,774	1,803	4,215	6,458	2,274	6,900	10,028	Services sociaux, commerciaux, industriels et personnels.....	14
279	472	386	287	586	637	363	687	783	Cinématographie et services récréatifs.....	15
1,675	2,240	2,374	1,516	2,622	3,516	1,911	4,619	5,951	Services personnels	16
893	1,257	1,374	811	1,145	1,875	1,077	2,032	2,668	Administration publique	17
16,458	19,149	27,858	16,541	23,874	40,579	22,119	33,809	55,604	Professions libérales et techniciens	18
440	671	1,372	656	2,117	4,066	1,871	3,053	4,476	Ingénieurs professionnels (y compris les arpenteurs).....	19
194	453	853	282	1,311	2,011	765	1,503	2,447	Ingénieurs civils (y compris les arpenteurs)	20
82	58	150	90	160	518	271	444	702	Ingénieurs mécaniciens (y compris les ingénieurs hydrauliciens).....	21
..	..	105	..	..	351	..	..	514	Ingénieurs mécaniciens	22
..	..	45	..	..	167	..	..	188	Ingénieurs industriels	23
103	72	132	141	168	322	355	365	499	Ingénieurs électriciens	24
..	32	42	..	135	260	..	199	223	Ingénieurs chimistes	25
..	..	470	..	..	686	..	..	558	Biologistes et spécialistes des sciences agricoles	26
85	92	96	74	93	180	53	80	123	Vétérinaires	27
7,942	7,920	10,358	6,452	7,173	14,713	5,274	7,525	15,437	Personnel enseignant.....	28
187	181	420	142	203	516	138	298	752	Professeurs et directeurs	29
7,755	7,641	9,517	6,310	6,878	13,562	5,136	7,073	14,086	Instituteurs	30
3,494	5,235	7,918	4,039	5,861	10,540	6,211	10,361	14,797	Spécialistes de la santé	31
527	651	951	603	840	1,356	810	1,375	2,150	Médecins et chirurgiens	32
188	215	199	201	304	428	321	503	637	Dentistes	33
1,245	2,175	3,632	1,573	2,271	4,904	2,755	4,637	7,130	Infirmiers (éres) diplômés (es)	34
802	1,138	1,555	913	1,255	1,584	1,060	1,783	1,949	Élèves infirmiers (éres)	35
40	44	36	46	73	125	64	103	134	Ostéopathes et chiropraticiens	36
..	413	891	..	406	1,035	..	696	1,326	Techniciens des soins médicaux et dentaires	37
459	433	459	514	601	1,038	642	954	1,347	Juristes	38
41	40	51	38	52	87	38	64	99	Juges et magistrats	39
418	393	403	476	549	951	604	890	1,248	Avocats et notaires	40
1,734	1,698	1,837	1,605	1,653	1,988	1,313	1,333	1,750	Clergé et ministres du culte.....	41
1,256	1,258	1,253	1,046	1,150	1,472	807	932	1,345	Ministres et pasteurs, n.d.a. ³	42
227	198	333	291	260	218	134	129	121	Religieux et religieuses, n.d.a. ³	43

TABLE 3. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

		Quebec — Québec			Ontario			Manitoba		
Occupation (as of 1961)		1941	1951	1961	1941	1951	1961	1941	1951	1961
No.										
Professional and technical occupations—Con.:										
1	Artists, writers and musicians	4,129	5,722	9,162	6,612	8,793	13,823	967	1,103	1,442
2	Artists and art teachers	964	1,461	2,240	1,618	2,362	3,603	174	263	306
3	Artists, commercial .....	..	956	1,384	..	1,979	2,732	..	233	228
4	Artists (except commercial), art teachers .....	..	505	856	..	383	871	..	35	70
5	Authors, editors and journalists	1,215	1,934	3,762	1,703	3,189	5,739	260	401	568
6	Musicians and music teachers	1,950	2,297	3,160	3,291	3,242	4,481	533	434	570
7	Other professionals .....	..	..	43,184	..	..	67,773	..	..	6,462
8	Architects	443	581	921	515	744	1,138	40	86	183
9	Draftsmen	1,868	..	5,023	3,083	..	9,975	172	..	802
10	Actuaries and statisticians .....	..	286	860	..	542	1,598	..	61	149
11	Librarians	259	334	709	858	1,037	1,663	78	99	128
12	Interior decorators and window dressers	287	652	994	430	1,115	1,799	60	138	202
13	Photographers	703	899	1,105	1,027	1,440	1,521	161	190	170
14	Clerical occupations	81,460	151,793	220,491	144,021	250,233	337,343	21,343	35,230	45,233
15	Office appliance operators	749	2,123	5,263	1,243	5,015	13,813	438	1,339	2,357
16	Shipping and receiving clerks .....	..	13,584	15,313	..	22,756	26,124	..	3,001	3,483
17	Baggage men and expressmen, transport	280	501	495	489	672	548	167	275	184
18	Ticket, station and express agents, transport	967	1,107	1,760	1,565	1,926	2,767	490	542	613
19	Stenographers, typists and clerk-typists	13,217	33,151	53,932	36,536	69,033	94,551	5,930	8,703	11,171
20	Stenographers .....	..	..	43,279	..	..	63,409	..	..	7,933
21	Typists and clerk-typists .....	..	..	10,653	..	..	26,142	..	..	3,252
22	Attendants, doctors' and dentists' offices .....	..	374	471	..	1,102	1,803	..	212	285
23	Sales occupations	59,530	76,416	103,118	80,773	103,239	159,215	12,462	16,022	20,923
24	Foremen, trade .....	..	1,695	2,383	..	2,762	5,108	..	462	770
25	Auctioneers	36	28	29	124	101	129	35	24	21
26	Cannassers, other door-to-door salesmen and demonstrators	2,521	2,051	3,660	2,928	1,991	5,352	521	473	756
27	Sales clerks (incl. service station attendants)	39,604	47,613	61,194	51,860	65,865	92,023	8,157	9,810	12,380
28	Sales clerks .....	..	46,371	57,653	..	62,039	83,730	..	9,534	11,623
29	Service station attendants .....	..	1,242	3,541	..	3,766	8,293	..	256	758
30	Advertising salesmen and agents .....	..	415	811	..	827	1,488	..	97	100
31	Insurance salesmen and agents	4,500	5,397	8,289	6,105	7,424	11,702	829	990	1,371
32	Real estate salesmen and agents	653	1,117	1,761	1,640	3,642	5,255	294	438	616
33	Security salesmen and brokers	654	729	1,272	1,590	1,465	2,416	132	136	193
34	Brokers, agents and appraisers, n.e.s. ² .....	..	956	1,229	..	1,297	2,436	..	307	383
35	Service and recreation occupations	123,081	134,339	167,671	143,697	179,147	204,474	20,463	39,229	45,322
36	Protective service occupations	13,167	25,462	39,254	15,771	43,208	63,189	2,623	7,239	11,943
37	Firemen, fire protection	1,424	2,153	3,209	1,926	3,294	5,216	400	679	813
38	Policemen and detectives	5,266	6,313	9,376	5,215	6,836	10,691	836	1,030	1,331
39	Guards, watchmen, n.e.s. ²	6,477	8,387	11,586	8,600	9,643	13,491	1,327	1,045	1,173
40	Housekeepers, waiters, cooks and related workers	89,631	76,552	105,902	99,251	80,947	143,409	21,126	15,225	22,063
41	Housekeepers (except private household), matrons, stewards	1,770	3,541	3,937	2,360	2,614	5,803	483	532	933
42	Cooks	8,299	10,731	15,163	3,299	9,944	15,133	1,471	1,712	2,557
43	Waiters, waitresses and bartenders	8,791	17,544	24,519	13,712	21,225	32,525	2,850	3,944	5,366
44	Waiters and waitresses .....	..	..	21,976	..	..	29,631	..	..	4,690
45	Bartenders .....	..	..	2,643	..	..	2,894	..	..	463
46	Nursing assistants and aides	3,235	6,474	14,145	4,452	8,742	24,049	544	1,400	3,822
47	Porters, baggage and pullman	1,300	1,687	1,358	1,802	1,929	1,833	536	627	50
48	Baby sitters, maids and related service workers, n.e.s. ²	60,697	35,275	43,370	57,576	34,789	50,223	13,806	5,995	6,611
49	Baby sitters .....	..	..	1,763	..	..	5,216	..	..	68
50	Maids and related service workers, n.e.s. ² .....	..	..	41,607	..	..	45,097	..	..	5,922

TABLEAU 8. Main-d'œuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1931, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹ — suite

Saskatchewan			Alberta			British Columbia Colombie-Britannique			Profession (comme en 1951)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
515	545	996	723	910	1,750	1,603	1,952	2,909	Professions libérales et techniciens -- fin:	
35	41	111	90	171	331	291	453	645	Artistes, écrivains et musiciens	1
..	31	72	..	137	233	..	363	392	Artistes et professeurs d'art	2
..	10	33	..	34	93	..	90	253	Dessinateurs publicitaires	3
120	222	399	180	304	662	451	754	1,210	Artistes (sauf publicité) et professeurs d'art	4
360	232	486	453	435	757	661	755	1,054	Écrivains, rédacteurs et journalistes	5
..	..	4,084	..	..	9,813	..	..	14,640	Musiciens et professeurs de musique	6
20	29	73	31	100	197	107	139	321	Autres professions libérales	7
29	..	468	107	..	1,647	332	..	1,812	Architectes	8
..	10	21	..	20	81	..	55	122	Dessinateurs	9
64	88	124	77	106	238	137	211	349	Actuaires et statisticiens	10
17	44	98	40	115	251	103	263	430	Bibliothécaires	11
105	119	121	178	222	230	334	419	388	Décorateurs-ensembliers et étalagistes	12
..	..	..	..	..	..	..	..	..	Photographes	13
11,959	16,801	26,039	14,214	30,361	55,317	22,110	50,076	73,033	Employés de bureau	14
117	363	718	241	614	2,233	172	1,072	2,563	Mécanographes	15
..	1,188	1,286	..	1,938	2,632	..	3,791	4,249	Commis d'expédition et de réception	16
133	217	153	148	253	162	98	193	111	Commis aux bagages et messagerie, transports	17
664	837	718	454	702	779	393	743	1,031	Agents (billets, stations, messagerie), transports	18
3,970	5,052	7,226	4,250	8,321	15,465	6,801	13,573	20,023	Sténographes, dactylographes et commis-dactylographes	19
..	..	5,701	..	..	12,455	..	..	16,072	Sténographes	20
..	..	1,525	..	..	2,950	..	..	3,951	Dactylographes et commis-dactylographes	21
..	135	158	..	214	332	..	471	738	Assistants, bureau de médecin et de dentiste	22
9,259	12,515	10,131	19,367	16,493	31,029	13,348	23,827	42,175	Vendeurs	23
..	309	438	..	451	556	..	669	719	Contremaîtres, commerce	24
33	35	37	47	55	90	28	50	35	Vendeurs à l'enchère	25
269	409	629	295	517	1,211	403	1,632	1,611	Solliciteurs, autres vendeurs à domicile et démonstrateurs	26
6,622	6,659	11,516	7,181	11,846	20,315	11,893	16,532	26,118	Commis-vendeurs [y compris pompistes (poste d'essence)]	27
..	8,313	10,502	..	11,380	18,165	..	15,632	23,776	Commis-vendeurs	28
..	348	1,016	..	465	2,149	..	900	2,342	Pompistes (poste d'essence)	29
..	40	93	..	105	165	..	223	312	Publicitaires	30
571	611	877	592	1,001	1,693	1,205	1,574	2,458	Agents et vendeurs d'assurances	31
196	225	304	319	794	936	919	2,015	2,111	Agents et vendeurs d'immeubles	32
60	70	158	112	227	379	410	337	703	Courtiers et négociants en valeurs	33
..	166	250	..	305	654	..	304	663	Courtiers, agents et estimateurs, n.c.a. ²	34
27,402	22,917	31,731	25,547	24,855	59,635	37,923	52,521	76,195	Travailleurs des services et des activités récréatives	35
1,735	2,866	5,322	1,827	9,700	14,973	3,825	13,261	19,366	Travailleurs des services de protection	36
197	293	565	237	514	1,101	581	1,177	1,550	Pompistes	37
961	1,050	1,478	859	1,030	1,935	1,599	1,855	2,643	Policiers et détectives	38
577	533	676	731	1,049	1,679	1,638	2,356	3,276	Gardiens, veilleurs, n.c.a. ²	39
21,356	14,529	18,129	18,869	17,576	28,917	25,668	26,739	40,047	Intendants, garçons de table, cuisiniers et travailleurs assimilés	40
393	384	756	460	615	1,203	1,207	1,500	1,982	Intendants (sauf maison privée), gouvernantes, stewards	41
1,300	1,495	2,106	1,870	2,597	4,341	4,313	4,887	6,014	Cuisiniers	42
2,049	2,774	3,745	2,845	4,507	6,917	4,218	6,717	9,453	Garçons et filles de table, barman	43
..	..	3,159	..	..	5,744	..	..	8,171	Garçons et filles de table	44
..	..	589	..	..	1,173	..	..	1,282	Barman	45
644	2,000	3,175	405	1,593	4,744	1,152	3,172	6,888	Assistants infirmiers et aides-infirmiers	46
224	221	174	247	326	247	463	382	408	Porteurs, bagages et pullman	47
15,842	7,015	7,001	11,933	7,383	10,443	12,070	8,811	12,981	Gardiens d'enfants, femmes et valets de chambre et travailleurs assimilés, n.c.a. ²	48
..	..	894	..	..	1,776	..	..	1,504	Gardiens d'enfants	49
..	..	6,107	..	..	8,667	..	..	11,417	Femmes et valets de chambre et travailleurs assimilés, n.c.a. ²	50

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

Percentage to decade percentage increase for Canada ¹ - Continued										
No.	Occupation (as of 1961)	Quebec — Québec			Ontario			Manitoba		
		1941	1951	1961	1941	1951	1961	1941	1951	1961
Service and recreation occupations—Con.:										
1	Athletes, entertainers and related workers	529	1,029	1,823	862	1,426	2,723	136	171	248
2	Actors, entertainers and showmen .....	..	..	972	..	..	1,058	..	..	98
3	Athletes and sports officials .....	..	..	851	..	..	1,685	..	..	150
4	Other service occupations	22,754	31,287	50,692	32,143	48,566	80,153	5,611	7,585	11,131
5	Barbers, hairdressers, manicurists	7,462	7,208	11,964	9,525	9,100	17,017	1,710	1,268	1,982
6	Launderers and dry cleaners	4,915	7,227	8,383	6,901	9,904	12,160	1,159	1,625	1,796
7	Elevator tenders, building	1,224	1,686	1,293	1,548	2,043	1,970	380	449	334
8	Janitors and cleaners, building	7,169	11,503	24,365	10,826	21,795	41,492	1,746	3,439	6,113
9	Funeral directors and embalmers	488	536	615	1,064	1,064	1,161	78	92	122
10	Guides .....	..	592	863	..	1,143	1,516	..	29	131
11	Transport and communication occupations	67,920	92,935	114,535	73,235	115,831	126,637	12,992	17,891	19,926
12	Air pilots, navigators and flight engineers	104	255	761	238	346	747	75	97	160
13	Operators, railroad	5,163	7,263	5,191	10,690	14,159	10,528	2,567	3,346	2,503
14	Locomotive engineers	1,184	1,934	1,270	2,685	3,506	2,869	650	693	647
15	Locomotive firemen	931	1,199	583	1,892	2,638	1,504	441	655	352
16	Conductors, railroad	765	1,218	1,085	1,658	2,595	2,297	344	497	445
17	Brakemen, switchmen and signalmen	2,283	2,912	2,253	4,454	5,419	3,858	1,132	1,496	1,064
18	Operators, water transport	3,712	3,952	4,449	4,074	3,803	3,841	127	133	151
19	Deck and engineering officers, ship	1,866	2,042	2,029	1,299	1,496	1,561	59	49	64
20	Deck ratings (ship), barge crews and boatmen .....	..	1,501	1,963	..	1,657	1,688	..	74	82
21	Engine-room ratings, firemen and oilers, ship	337	409	457	532	650	592	10	10	5
22	Operators, road transport	32,953	56,505	80,242	40,601	64,330	88,326	5,894	8,901	11,942
23	Bus drivers	745	2,936	5,702	1,112	3,548	4,907	301	739	1,231
24	Taxi drivers and chauffeurs	5,969	10,302	10,073	3,566	5,381	6,166	463	807	685
25	Other transport occupations .....	..	..	982	..	..	2,033	..	..	59
26	Operators, electric street railway	2,302	2,496	5	1,949	2,649	1,253	463	248	2
27	Other communication occupations .....	..	..	17,712	..	..	23,642	..	..	3,562
28	Radio and television announcers	89	229	377	161	338	546	22	67	103
29	Telephone operators	3,314	7,532	9,230	5,525	12,624	13,526	803	1,337	1,933
30	Telegraph operators	1,387	1,777	1,097	1,731	2,006	1,385	397	504	293
31	Postmen and mail carriers	1,860	2,352	3,430	3,054	3,603	5,276	380	426	626
32	Farmers and farm workers	219,933	192,695	132,576	263,106	202,544	172,171	91,784	73,573	59,924
33	Farmers and stockraisers	133,572	103,092	75,256	159,568	133,018	96,159	53,989	49,926	38,694
34	Farm managers and foremen	355	523	363	925	1,275	1,294	273	277	190
35	Farm labourers .....	..	80,031	50,774	..	61,154	62,729	..	22,187	19,311
36	Gardeners (except farm), groundskeepers and other agricultural occupations .....	..	3,244	6,163	..	7,097	11,989	..	1,186	1,729
37	Gardeners (exc. farm) and groundskeepers .....	..	..	5,439	..	..	10,137	..	..	1,312
38	Other agricultural occupations .....	..	..	724	..	..	1,852	..	..	417
39	Loggers and related workers	29,931	31,469	31,938	14,228	16,229	11,607	1,493	1,236	876
40	Forest rangers and cruisers .....	..	1,627	2,346	..	1,350	1,400	..	124	297
41	Fishermen, trappers and hunters ²	8,053	4,950	2,766	6,333	2,076	1,856	5,130	1,546	1,253
42	Fishermen ²	5,210	3,526	2,348	2,269	1,754	1,482	1,528	1,002	741
43	Trappers and hunters ² .....	..	1,424	418	..	322	374	..	544	512
44	Miners, quarrymen and related workers	9,593	11,647	12,891	23,293	27,331	25,649	2,119	2,069	2,697
45	Prospectors .....	..	158	197	..	392	302	..	54	40

For footnotes 1 and 2, see page 2-5.

TABLEAU 8. Main-d'œuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de décennie en décennie, Canada¹ — suite

Saskatchewan			Alberta			British Columbia Colombie-Britannique			Profession (comme en 1961)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
76	158	150	138	225	365	252	445	727	Travailleurs des services et des activités récréatives—fin:	
..	..	35	..	..	129	..	..	310	Athlètes, comédiens et travailleurs assimilés	1
..	..	115	..	..	236	..	..	417	Acteurs, comédiens et directeurs de spectacles	2
									Athlètes et officiels d'organisations sportives	3
4,235	5,364	8,130	4,713	7,394	14,800	8,183	12,076	18,059	Autres travailleurs des services	4
1,568	1,131	1,665	1,624	1,481	2,826	2,028	1,964	3,538	Barbiers, coiffeurs, manucures	5
691	1,122	1,270	1,003	1,723	2,336	2,651	3,163	2,522	Blanchisseurs, dégraisseurs	6
108	131	135	170	234	231	377	505	454	Garçons d'ascenseur	7
1,439	2,504	4,427	1,461	3,205	8,304	2,906	5,328	9,648	Concierges et nettoyeurs, immeubles	8
89	91	128	92	120	163	145	182	224	Entrepreneurs de pompes funèbres, embaumeurs	9
..	12	79	..	30	49	..	62	96	Guides	10
9,646	13,463	14,706	11,409	19,829	28,261	19,975	32,932	37,651	Travailleurs des transports et communications	11
50	35	63	45	106	269	49	225	595	Pilotes, navigateurs et mécaniciens navigants	12
2,212	2,818	1,917	2,336	3,432	2,379	2,373	3,037	2,548	Conducteurs, chemin de fer	13
594	628	544	594	779	643	643	714	683	Mécaniciens de locomotive	14
427	652	255	464	716	284	431	616	387	Chauffeurs de locomotive	15
336	403	319	356	518	506	348	495	542	Chefs de train, chemin de fer	16
865	1,135	799	922	1,419	946	951	1,212	936	Servo-freins, aiguilleurs et signaleurs	17
56	80	84	107	119	162	3,098	3,845	4,099	Conducteurs, transport par eau	18
3	5	11	32	28	40	1,574	2,144	2,424	Officiers de pont et officiers mécaniciens, navire	19
..	69	72	..	84	119	..	1,444	1,475	Matelots de pont (navire), marinières et bateliers	20
—	6	1	4	7	3	277	257	200	Matelots mécaniciens, chauffeurs et graisseurs, navire	21
3,747	6,088	8,874	5,304	11,034	18,848	8,142	16,825	22,149	Conducteurs, transport routier	22
88	233	1,049	133	906	2,637	344	1,938	1,643	Conducteurs d'autobus	23
193	344	411	255	621	778	676	1,462	1,428	Conducteurs de taxi et chauffeurs	24
..	..	136	..	..	86	..	..	225	Autres travailleurs des transports	25
119	94	2	275	247	10	1,258	480	25	Conducteurs de tramways	26
..	..	3,022	..	..	4,899	..	..	5,973	Autres travailleurs des communications	27
30	61	118	36	88	151	44	119	144	Annonces de radio et de télévision	28
814	1,472	1,920	641	1,383	2,945	1,598	3,589	3,015	Téléphonistes	29
348	441	256	342	455	278	541	599	453	Télégraphistes	30
344	364	458	412	487	881	526	778	1,345	Facteurs et postiers	31
187,137	144,261	119,589	141,032	114,926	104,162	41,470	28,395	24,455	Agriculteurs et travailleurs agricoles	32
123,837	108,999	85,343	92,175	82,109	65,150	24,377	18,310	11,781	Cultivateurs et éleveurs	33
381	374	289	484	492	420	385	511	453	Gérants et contremaîtres de ferme	34
..	36,822	32,547	..	30,724	35,663	..	6,950	8,648	Ouvriers agricoles	35
..	1,066	1,401	..	1,601	2,929	..	2,624	3,573	Jardiniers (sauf sur la ferme), ouvriers-jardiniers et autres travailleurs agricoles	36
..	..	831	..	..	2,034	..	..	3,146	Jardiniers (sauf sur la ferme) et ouvriers-jardiniers	37
..	..	570	..	..	845	..	..	427	Autres travailleurs agricoles	38
920	590	1,016	938	1,345	2,195	13,879	17,956	12,668	Bûcherons et travailleurs forestiers	39
..	125	470	..	190	1,126	..	651	1,036	Gardes et estimateurs forestiers	40
2,675	1,367	1,133	3,004	958	814	9,478	5,324	4,974	Pêcheurs, trappeurs et chasseurs ¹	41
179	510	556	171	108	302	7,597	5,120	4,921	Pêcheurs ²	42
..	857	532	..	850	512	..	204	53	Trappeurs et chasseurs ³	43
823	846	2,014	7,540	7,469	5,291	10,625	7,194	4,865	Mineurs, carriers et travailleurs assimilés	44
..	36	32	..	37	21	..	217	188	Prospecteurs	45

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Continued

No.	Occupation (as of 1961)	Quebec Québec			Ontario			Manitoba		
		1941	1951	1961	1941	1951	1961	1941	1951	1961
1	Craftsmen, production process and related workers	393,733	400,913	477,893	397,931	540,391	610,541	41,053	58,597	65,000
2	Millers, bakers, brewers and related food workers .....	..	..	22,095	..	..	25,410	..	..	3,000
3	Millers of flour and grain	592	626	821	1,352	1,059	935	130	83	90
4	Fruit and vegetable canners and packers .....	..	279	449	..	1,195	2,187	..	27	70
5	Tire builders, vulcanizers and other rubber workers .....	..	..	3,135	..	..	6,340	..	..	13,000
6	Tire and tube builders .....	..	430	173	..	3,705	2,403	..	3	1,000
7	Vulcanizers .....	..	235	445	..	836	1,016	..	83	10,000
8	Leather cutters, lasters, sewers and other leather workers (except glove and garment)	13,347	11,674	12,439	8,530	7,709	9,031	843	598	430
9	Leather cutters .....	..	1,660	1,589	..	971	1,010	..	39	40
10	Shoemakers and repairers—factory, n.e.s. ² .....	..	5,786	7,329	..	3,865	5,137	..	133	90
11	Shoemakers and repairers—not in factory	2,900	2,123	1,733	2,251	1,624	1,511	567	345	200
12	Spinners, weavers, knitters and related workers .....	..	..	20,749	..	..	11,563	..	..	13,000
13	Weavers	6,160	5,993	3,065	2,927	2,520	1,219	41	53	1,000
14	Tailors, furriers, upholsterers and related workers	42,531	55,670	58,467	25,620	32,539	32,100	4,408	6,782	6,000
15	Dressmakers and seamstresses—not in factory	5,093	6,187	6,231	2,930	3,852	5,293	603	804	700
16	Upholsterers	881	1,179	1,673	1,870	2,807	2,674	236	349	410
17	Carpenters, cabinetmakers, sawyers and related workers .....	..	..	52,442	..	..	50,397	..	..	6,000
18	Carpenters	29,273	39,874	38,022	23,311	39,147	36,576	5,770	6,951	5,700
19	Sawyers	2,163	3,591	2,903	1,613	2,423	2,433	229	155	110
20	Inspectors, graders, scalers—log and lumber	1,363	2,114	2,183	608	893	948	30	22	1,000
21	Printers, bookbinders and related workers	6,176	8,551	11,343	11,397	15,132	18,668	1,573	1,697	1,000
22	Compositors and typesetters .....	..	4,317	4,675	..	6,999	7,433	..	867	600
23	Photoengravers, pressmen—printing, lithographic and photo-offset occupations .....	..	2,229	4,087	..	4,505	6,787	..	402	530
24	Pressmen, printing .....	..	..	2,915	..	..	4,315	..	..	410
25	Lithographic and photo-offset occupations .....	..	..	823	..	..	1,785	..	..	600
26	Photoengravers .....	..	..	344	..	..	687	..	..	300
27	Bookbinders .....	..	1,073	1,453	..	1,543	1,784	..	130	150
28	Other occupations in bookbinding .....	..	366	341	..	829	1,121	..	186	150
29	Printing workers, n.e.s. ² .....	..	541	787	..	1,256	1,543	..	112	800
30	Furnacemen, moulders, blacksmiths and related metal workers .....	..	..	9,123	..	..	16,025	..	..	1,300
31	Heat treaters, annealers, temperers	53	113	206	425	607	765	5	9	1,000
32	Rolling mill operators .....	..	237	308	..	1,171	1,535	..	96	800
33	Blacksmiths, hammermen, forgemen	4,923	3,229	1,661	4,323	2,779	1,844	1,016	616	300
34	Coremakers .....	..	243	120	..	1,642	717	..	61	300
35	Jewellers, watchmakers and engravers .....	..	..	2,205	..	..	2,364	..	..	200
36	Engravers, except photoengravers .....	..	316	378	..	485	419	..	31	300
37	Machinists, plumbers, sheet metal workers and related workers .....	..	..	60,279	..	..	115,569	..	..	7,400
38	Toolmakers, die-makers	994	1,576	1,833	5,863	7,577	8,330	47	77	120
39	Fileers, grinders, sharpeners	674	881	950	3,153	4,844	3,865	100	104	110
40	Millwrights	893	1,976	1,623	2,454	3,701	4,632	146	141	190
41	Fitters and assemblers, n.e.s. ² —metal .....	..	2,411	3,061	..	13,083	13,192	..	189	200
42	Plumbers and pipefitters	6,880	10,046	12,424	7,200	10,926	13,282	932	1,114	1,300
43	Sheet metal workers .....	..	3,205	4,753	..	6,527	7,259	..	1,019	1,000
44	Riveters and rivet heaters .....	..	915	789	..	815	412	..	65	300
45	Boilermakers, platers and structural metal workers .....	..	1,505	2,499	..	2,155	2,689	..	503	200
46	Welders and flame cutters	3,176	5,899	10,714	6,463	11,733	17,245	559	936	1,700
47	Polishers and buffers—metal	861	913	753	2,319	2,785	1,897	21	27	300

For footnotes 1 and 2, see page 8-1.

TABLE 8. Labour force, 15 years of age and over, by occupation divisions, comparable major occupation groups and classes as of 1961, for Canada¹ and the provinces, 1941-1961 Censuses showing the decade-to-decade percentage increase for Canada¹ - Concluded

No.	Occupation (as of 1961)	Quebec — Québec			Ontario			Manitoba		
		1941	1951	1961	1941	1951	1961	1941	1951	1961
	Craftsmen, production process and related workers - Con.:									
1	<i>Mechanics and repairmen, electricians and related electrical and electronics workers.</i>	30,789	56,661	81,850	45,352	91,287	116,153	6,497	11,733	14,891
2	Mechanics and repairmen, aircraft .....	..	1,493	3,014	..	760	1,115	..	650	805
3	Mechanics and repairmen, motor vehicle .....	..	15,619	25,180	..	22,912	31,855	..	4,107	4,532
4	Mechanics and repairmen, railroad equipment .....	..	2,484	2,055	..	3,165	1,920	..	1,634	1,343
5	Power station operators	602	894	1,489	1,077	1,569	1,719	141	213	321
6	Projectionists, motion picture	295	424	323	618	752	483	101	119	71
7	Linemen and servicemen—telephone, telegraph and power.	...	4,136	6,991	...	8,725	10,397	...	1,171	1,683
8	Fitters and assemblers—electrical and electronics equipment; electrical and electronics workers, n.e.s. ²	..	3,816	5,090	..	13,099	12,695	..	203	278
9	Fitters and assemblers—electrical and electronics equipment.	..	..	4,292	..	..	10,172	..	..	235
10	Electrical and electronics workers, n.e.s. ² .....	..	..	798	..	..	2,524	..	..	13
11	<i>Painters, paperhangers and glaziers</i>	<i>13,304</i>	<i>14,445</i>	<i>15,115</i>	<i>15,793</i>	<i>19,021</i>	<i>20,581</i>	<i>2,240</i>	<i>2,641</i>	<i>2,473</i>
12	<i>Bricklayers, plasterers and construction workers, n.e.s.²</i>	<i>7,028</i>	<i>13,506</i>	<i>21,837</i>	<i>9,308</i>	<i>20,202</i>	<i>30,049</i>	<i>1,096</i>	<i>2,102</i>	<i>3,422</i>
13	General foremen—construction	1,204	3,077	4,616	1,398	3,875	6,168	204	503	931
14	Inspectors—construction	151	390	998	191	613	1,562	29	119	210
15	Bricklayers, stonemasons, tilers, setters, cement and concrete finishers.	..	5,662	7,884	..	8,986	12,615	..	545	1,174
16	Bricklayers, stonemasons, tilers, setters .....	...	...	6,213	...	...	10,026	...	...	816
17	Cement and concrete finishers .....	...	...	1,671	...	...	2,589	...	...	359
18	Plasterers and lathers	1,414	2,531	2,735	1,707	3,747	4,123	294	564	614
19	<i>Clay, glass and stone workers</i>	<i>..</i>	<i>..</i>	<i>4,244</i>	<i>..</i>	<i>..</i>	<i>5,831</i>	<i>..</i>	<i>..</i>	<i>328</i>
20	Lens grinders and polishers; opticians .....	..	347	374	..	693	764	..	85	169
21	Furnacemen and kilnmen, ceramics and glass .....	..	173	220	..	537	724	..	28	14
22	Stone cutters and dressers	932	905	841	520	559	561	67	88	70
23	<i>Stationary engine and excavating and lifting equipment operators and related workers.</i>	<i>..</i>	<i>..</i>	<i>24,862</i>	<i>..</i>	<i>..</i>	<i>41,175</i>	<i>..</i>	<i>..</i>	<i>6,031</i>
24	Boiler firemen (except ship)	3,459	4,133	2,794	2,271	2,646	1,455	374	459	251
25	Stationary engineers .....	...	5,862	6,136	...	11,080	13,225	...	1,119	1,365
26	Motormen (vehicle), except railway .....	..	222	303	..	897	1,318	..	52	59
27	Hoistmen, crane men, derrickmen, operators of earth-moving and other construction machinery, n.e.s. ²	..	3,568	9,773	..	8,673	17,614	..	1,085	2,177
28	Hoistmen, crane men, derrickmen .....	..	...	2,811	..	...	7,093	..	...	535
29	Operators of earth-moving and other construction machinery, n.e.s. ²	..	..	6,962	..	..	10,531	..	..	1,642
30	<i>Longshoremen and stevedores</i>	<i>4,438</i>	<i>4,042</i>	<i>4,499</i>	<i>1,330</i>	<i>460</i>	<i>1,337</i>	<i>18</i>	<i>19</i>	<i>23</i>
31	<i>Sectionmen and trackmen</i>	<i>3,689</i>	<i>4,337</i>	<i>3,325</i>	<i>7,046</i>	<i>8,754</i>	<i>6,330</i>	<i>2,689</i>	<i>3,003</i>	<i>2,595</i>
32	<i>Other production process and related occupations</i>	<i>..</i>	<i>..</i>	<i>54,253</i>	<i>..</i>	<i>..</i>	<i>86,274</i>	<i>..</i>	<i>..</i>	<i>6,726</i>
33	Tobacco preparers and products makers	3,200	3,275	3,287	481	360	774	—	—	—
34	Patternmakers (except paper)	419	714	517	989	1,266	1,197	41	51	39
35	Paper products makers .....	..	2,529	3,229	..	4,513	5,357	..	287	411
36	Photographic processing occupations .....	..	322	681	..	783	1,467	..	98	140
37	Inspectors, examiners, gaugers, n.e.s. ² —metal .....	..	2,936	3,521	..	9,193	9,823	..	156	264
38	Inspectors, graders and samplers, n.e.s. ² .....	..	502	769	..	1,235	1,561	..	471	429
39	Labourers³ (incl. warehousemen and freight handlers, n.e.s.²).	86,900	107,724	109,696	97,255	127,411	121,692	12,253	17,565	17,280
40	Labourers ³ .....	..	..	92,930	..	..	113,305	..	..	15,574
41	Warehousemen and freight handlers, n.e.s. ² .....	..	..	8,666	..	..	8,596	..	..	1,416
42	Occupation not stated	4,421	25,616	53,331	4,101	13,694	54,431	336	2,392	8,003

For footnotes 1 and 2, see page 8-1.

³ See "Introduction".

TABLEAU 8. Main-d'œuvre âgée de 15 ans et plus selon la division professionnelle et principaux groupes et classes comparables de professions de 1961, Canada¹ et provinces, recensements de 1941-1961 et augmentation procentuelle de l'économie en économie, Canada¹ — fin

Saskatchewan			Alberta			British Columbia Colombie-Britannique			Profession (comme en 1961)	N°
1941	1951	1961	1941	1951	1961	1941	1951	1961		
5,199	7,820	10,662	6,096	11,804	18,542	8,760	17,741	25,873	Ouvriers de métiers, artisans, ouvriers à la production et travailleurs assimilés — fin ¹	
..	75	78	..	302	526	..	401	802	Mécaniciens et réparateurs, électriciens et travailleurs assimilés de l'électricité et de l'électronique.	1
..	4,418	4,828	..	5,579	7,370	..	5,660	7,387	Mécaniciens et réparateurs d'avions	2
..	186	290	..	406	326	..	523	400	Mécaniciens et réparateurs d'automobiles	3
64	148	273	43	107	142	213	449	448	Mécaniciens et réparateurs de matériel de chemin de fer	4
97	101	73	145	146	104	182	221	165	Opérateurs de centrales électriques	5
...	764	1,308	...	870	1,930	...	1,655	3,038	Projectionnistes de cinéma	6
..	15	47	..	26	154	..	193	355	Monteurs et réparateurs de lignes téléphoniques, télégraphiques et électriques.	7
..	..	40	..	..	134	..	..	303	Ajusteurs et monteurs — matériel électrique et électronique; travailleurs en électricité et électronique, n.c.a. ²	8
..	..	7	..	..	20	..	..	52	Ajusteurs et monteurs — matériel électrique et électronique.	9
..	..	..	..	..	..	..	..	..	Travailleurs en électricité et électronique, n.c.a. ²	10
1,004	1,091	1,357	1,237	2,126	3,151	3,112	3,742	3,876	Peintres, tapissiers et vitriers	11
466	1,178	2,518	857	3,449	5,865	2,058	4,490	6,162	Briqueteurs, plâtriers et ouvriers de la construction, n.c.a. ²	12
83	385	936	192	904	1,946	437	1,230	1,605	Contrôleurs de la construction	13
8	48	97	15	114	319	34	179	392	Inspecteurs de la construction	14
..	345	689	..	855	1,608	..	987	1,397	Briqueteurs, maçons, carreleurs et finisseurs en béton	15
...	...	469	...	...	974	...	...	907	Briqueteurs, maçons, carreleurs	16
...	...	220	...	...	634	...	...	490	Finisseurs en béton	17
161	240	301	313	933	942	638	960	985	Plâtriers et poseurs de lattes	18
..	..	229	..	..	780	..	..	574	Travailleurs de l'argile, du verre et de la pierre	19
..	59	68	..	92	124	..	161	175	Rodeurs et polisseurs de lentilles; opticiens	20
..	35	24	..	106	101	..	51	42	Chauffeurs de four de céramique et de verrerie	21
21	35	28	34	33	34	70	71	64	Taillieurs et cresseurs de pierre	22
..	..	7,563	..	..	11,069	..	..	17,092	Conducteurs de machines fixes, d'appareils d'excavation et de levage et travailleurs assimilés.	23
256	351	203	263	392	288	632	896	513	Chauffeurs de chaudière (sauf navire)	24
...	792	1,004	...	1,604	1,724	...	3,220	3,276	Conducteurs de machines fixes	25
..	9	51	..	294	235	..	335	140	Garde-moteurs (véhicule), sauf chemin de fer	26
..	529	1,911	..	1,305	3,681	..	3,932	6,100	Conducteurs de treuils, de grues et de derricks, conducteurs de machines de terrassement et de construction, n.c.a. ²	27
..	...	196	..	...	542	..	...	2,427	Conducteurs de treuils, de grues et de derricks	28
..	..	1,715	..	..	3,139	..	..	3,673	Conducteurs de machines de terrassement et de construction, n.c.a. ²	29
17	16	16	26	27	34	1,700	2,036	2,565	Débardeurs et crémiers	30
3,307	4,335	2,866	2,476	3,055	2,714	2,876	2,845	2,776	Cantonniers et poseurs de rails	31
..	..	2,706	..	..	7,005	..	..	12,010	Autres ouvriers à la production et travailleurs assimilés	32
..	..	..	1	..	..	14	2	1	Travailleurs du tabac et des produits du tabac	33
4	1	3	25	26	22	144	138	105	Patronniers (sauf papier)	34
..	13	54	..	48	160	..	435	485	Travailleurs des articles en papier	35
..	66	109	..	123	237	..	190	290	Travailleurs des procédés photographiques	36
..	25	63	..	77	243	..	229	349	Inspecteurs, examinateurs, calibriers, n.c.a. ² — métaux	37
..	270	217	..	384	359	..	392	513	Inspecteurs, classeurs, échantillonneurs, n.c.a. ²	38
8,180	8,982	10,972	10,273	16,771	21,827	25,351	32,097	32,976	Manœuvres ³ (y compris les ouvriers de l'entreposage et de la maintenance, n.c.a. ²)	39
..	..	9,803	..	..	19,615	..	..	28,699	Manœuvres ³	40
..	..	1,169	..	..	2,212	..	..	4,277	Ouvriers de l'entreposage et de la maintenance, n.c.a. ²	41
476	1,581	7,655	403	2,016	11,453	929	6,176	17,187	Professions non déclarées	42

Pour renvois 1 et 2, voir page 8-2.

¹ Voir "Introduction".

APPENDIX C

Job Vacancy Survey

Canada Department of Manpower and Immigration

An additional method for projecting manpower requirements may be implicit in the material in Appendix C which was received too late to be discussed in the text.

Basically, this method would be similar to Method I (Chapter 2, above); however, the sample in Alberta may be more representative.

Definitional and Design Aspects of the Canadian Job Vacancy Survey

SYLVIA OSTRY and ALAN SUNTER*

The Canadian Job Vacancy Survey has been developed to meet the need for current information on the regional and occupational demand for labor. It is comparable in magnitude and complexity to the Canadian Labor Force Survey which supplies current information on the supply of labor.

The survey itself is a two-phase survey, the mail sample on each occasion being subsampled for interview follow-up. The interview data are used as an integral part of the estimating functions and not merely as data for evaluation, although of course they serve that purpose as well.

Because it is intended to use the JVS as a vehicle for the collection of supplementary data from time to time, the computer systems which support the survey have been designed to give as much flexibility as possible to the processing of survey data.

1. INTRODUCTION

In recent years, in both Canada and the United States, a growing emphasis on selective manpower policies has generated an insistent demand for more and better labor market data. Although there are still serious gaps in information on labor supply (particularly on small area detail, hours of work and inter-occupational and inter-industrial mobility) there is, in fact, an impressive network of information on the characteristics of the unemployed while the void on the demand side is virtually absolute. The only statistics available on unfilled demand are those derived as a by-product of the employment service and these suffer from serious conceptual and coverage limitations. In effect, then, demand can only be observed indirectly, by the analysis of employment and wage statistics.

In Canada, in response to data needs for policy formulation and implementation, the Dominion Bureau of Statistics developed a national survey to measure job vacancies on behalf of the Department of Manpower and Immigration. The purpose of this article is to describe the development of the Canadian Job Vacancy Survey and to illustrate some of the major definitional and operational difficulties in implementing such a program.

2. CONCEPTUAL AND DEFINITIONAL PROBLEMS

The development of the Canadian Job Vacancy Survey exemplifies the conflict of interest that often faces the designers of a new, major, continuing survey: the conflict between the immediate needs for certain kinds of descriptive data for policy-determining purposes and the longer term, and only partially defined, needs for analytic data for economic and social research. The essence of the

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conflict is that the flexibility of design required for the latter purpose may imply a certain loss of statistical efficiency in satisfying the former.

The problem is compounded in the case of the present survey because the definition of a job vacancy is itself a matter of considerable difficulty and is likely to depend ultimately on the development of a more complete theory of the labor market. This is even more true of the definitions of different classes of job vacancy (e.g., long duration, hard to fill, future starting date vacancies).

A formal symmetry between jobs and workers provides the starting point for a definition of a job vacancy. Thus if an unemployed worker is one who has not worked during a specified reference period and is actively seeking a job, then, by analogy, a vacant job is one that has not been occupied during some specified reference period and is actively seeking a worker.¹

The core of the job vacancy definition is current activity, i.e., some objective recruiting action which has been undertaken during some precisely specified time period. Thus a major function of the interview phase of the survey is to ascertain the nature and date of activity with respect to each vacancy reported not because such information is desired *per se* (although it is potentially useful information and will be analyzed at some later stage) but to ensure that the activity criterion of the definition is satisfied.²

There is no doubt that one effect of an insistence on stringent application of the activity criterion is to exclude some genuine shortage vacancies; as both our pilot and current surveys indicate, many employers will insist that they urgently require a particular type of labor but have given up looking because they are sure that action will produce no results. Our experience also shows, however, that it is difficult to elicit from such respondents a definite number of vacancies; the enumeration deteriorates into negotiation on estimates between the field officer and the respondent. This, as we know from many years experience in measuring unemployment, tends to create nebulous estimates which are based on subjective attitudes and differ widely between mail and interview surveys and between enumerators.

There are several implications for survey design in this rigorous commitment to the activity criterion. Thus our experience has shown that to ascertain as accurately as possible the nature and timing of specific actions (and other elements in the definition) we need to secure information from a respondent engaged in or close to a center of recruiting activity in the enterprise because:

1. There are rarely complete or even partial statistical records within establishments or firms from which a comprehensive count of job vacancies can be made. Such records as exist may be entirely inappropriate to the *ex ante*, activity-centered definition adopted.
2. In few but the smallest of organizations is there a single locus of decision responsibility regarding recruitment and hiring. The responsibility is often dispersed both occupationally and geographically.

¹ The major variable which provides a link between labor demand and supply systems is occupation. Thus jobs must be identified at least by job title, a proxy for (i.e., codable into) occupation. Other "links" are more tenuous--industry, education, age, sex, etc. The Job Vacancy Survey at present identifies vacancies by occupation, industry and location, since labor markets have geographic as well as occupational dimensions.

² The application of the activity criterion is far looser in the current Canadian definition of unemployment, although it is not in the revised United States definition. For a review of the present Canadian measure and the revised United States definition, see [11].

As a consequence, the Job Vacancy Survey itself was preceded by, and as an ongoing survey is paralleled by, a Profile Survey of large business organizations. Starting with a list of companies the task of the field staff in the Profile Survey was to group these companies into enterprises defined as the smallest group of companies which have to be considered together in setting up a job vacancy reporting structure. (In many, if not most, cases the enterprise and the company coincide. However, in many of the largest business organizations many companies are involved whose employment, and hence whose vacancies, cannot be distinguished from that of the enterprise as a whole.)

The persons or officers within the enterprise who have, or can get, immediate information about current job vacancies are then determined and descriptions of the class of jobs for which they can report are obtained. The descriptions are checked against each other and against the description (usually the names of a set of companies) of the enterprise as a whole to ensure, as far as possible, that the set of Job Vacancy Reporting Units (JVRU) whose addresses and descriptions were thus obtained are mutually exclusive with respect to the classes of jobs they cover and that together they exhaust the vacancies that can occur in the enterprise. These JVRU's are the sample units for the Job Vacancy Survey. Both the address (of necessity) and the description are printed on questionnaires mailed out to these units and on listings sent out to our field staff.

A second element in the definition of vacant jobs concerns the time dimension of the word "vacant." Again, referring back to the definition of an unemployed worker, the reference period is one week, i.e., a worker must not have worked at all (even one hour) during the reference week (and must have sought work). Clearly if a different reference period had been chosen, a different measure would have resulted. Since the choice of a reference period for vacant jobs was essentially arbitrary—except that the use of one week would have provided another element of formal symmetry with the supply measure—the decision was made on grounds of operational effectiveness. Problems of recall in the absence of records were such that—at least for the present—we have settled on a period of one day, i.e., jobs must have been vacant for the full reference day. This eliminates the instant vacancies which can be filled immediately and are therefore often difficult to recall even a short time after the event.

A third definitional criterion is "externality," i.e., the jobs must be seeking workers from *outside*, or at least must not be restricted to workers from inside, the firm. The measure of vacancies, therefore, will relate to the *external market*. It is assumed that labor requirements feed through the internal market before appearing as vacancies in the external market.³

A related definitional problem concerns the treatment of vacant jobs being held for workers on layoff subject to definite recall. These are excluded in our definition on several grounds, namely, they do not satisfy either the activity or externality criteria. But it is important to note that workers on layoff subject to recall are classified as unemployed. This is an inconsistency in the unemployment definition since such workers typically do not seek work and, moreover, may be considered to have a relatively firm job attachment, thus violating the

³ For a discussion of a treatment of the internal vacancies in a probabilistic model, see [12].

two main definitional criteria of unemployment. This difference in the two measures can, however, be reconciled so long as the temporary layoffs are classified as a subcategory of the unemployed. Further, it is unlikely that recall jobs ever form a significant proportion of total vacancies plus recalls.

The final element in the definition is that of "availability," i.e., when is the job available to the worker being actively sought? Two kinds of vacancies are included, but distinguished, in the survey: those immediately available (current vacancies) and those available at some specified future starting date (F.S.D. vacancies). Note that the seeking in both cases must be current.⁴ The reason for including F.S.D. vacancies was primarily operational. This kind of anticipatory recruiting is common practice in certain industries, e.g., education, construction, etc. If no provision is made on the questionnaire for reporting them separately from other vacancies, they are either never reported or are erroneously included in the "immediately available" category. It should be stressed to avoid confusion, that an F.S.D. vacancy is not a forecast vacancy. It is the recruiting which is anticipatory and not the job.

In summary, the definition of job vacancies used in the present Canadian Job Vacancy Survey is a job:

1. That was vacant for the full reference day,
2. For which some specific recruiting action was undertaken during a specified time period.
3. That was open to workers from outside the establishment, and
4. Was either immediately available or available at a specified future starting date.

Such jobs are to be reported in terms of the job title used in the firm.

Several additional items of information are also requested: job location (if different from mailing address of the JVRU); full-time vacancies; vacancies for which recruiting action has been undertaken at some time in *both* the four weeks preceding the reference day and the four weeks preceding that (jobs vacant one month ago) and hiring rates for full-time jobs. The "jobs vacant one month ago" will, one hopes, provide some guidance to the "duration mix" of demand—a crucial series for potential analytical work.⁵

3. OPERATIONAL PROBLEMS

An objective of the Canadian survey has been sufficient flexibility in its design and organization to respond with minimum difficulty to requirements for analytic data as they evolve.

Two major features of the survey design were that it would be (1) a two-phase survey, involving a first (mail) phase and a second (interview) phase as integral data collection features in each survey cycle, and (2) oriented to the estimation of three-month moving averages of vacancies.

The reasons behind the choice of a two-phase design were:

1. The response rate, in the absence of follow-up action, to a business survey of this type varies in Canada from about 50 percent to 80 percent depending on the stratum to which the reporting unit belongs. The usual kind of mail follow-up for

⁴ The time horizon of current seeking is actually during the four weeks prior to the reference date, which is identical to that of the revised United States definition of unemployment.

⁵ For a discussion of the importance of duration indicators on both the demand and supply side, see [5].

this survey is precluded by the requirement for tabulations as soon as possible after the reference date and the rapid deterioration of recall of information that is not a matter of record in most businesses. In the absence of rapid field follow-up, imputations would have to be made for from 20 percent to 50 percent of the sample. Our early experiments and subsequent experience have failed, however, to reveal any satisfactory basis for imputations. Thus, satisfactory estimates are impossible without the rapid field follow-up built into our design.

2. It was clear that our ability to respond rapidly to request for the collection of information in the area of labor demand, additional to our regular data, would require the recruitment, training, and deployment of a staff of enumerators, and, in view of the caliber of enumerator required, this staff should be permanently employed.
3. An early pilot survey indicated a substantial downward bias in the response to the mail survey relative to that obtained in subsequent interview follow-ups, i.e., fewer vacancies were reported by mail than were reported in subsequent interviews of the mail respondents. Unfortunately the bias arising from the respondent's misunderstanding of the definitions or our misdirection was confounded with the lack of precision in defining suitable reporting units. Since that time a general tightening up of definitions and procedures on the one hand, and the introduction of the Profile Survey on the other, appear to have effected substantial reductions in errors arising from both sources. In any event the apparent magnitude of the response bias of a pure mail survey was a major factor in our decision and it remains true, in spite of the considerable reduction we have achieved, that response bias would continue to be a troublesome feature in a mail survey.
4. It was clear that both the initial delineation and the continuing maintenance of the JVRU structures set up by the Profile Survey would require field work on the part of well-trained, high caliber field staff, and that once the ongoing survey was established it would be efficient to combine the tasks of interviewing as part of the Job Vacancy Survey itself with a systematic review of the JVRU structures.

The necessity of investigating and defining the structure of reporting units is not, of course, unique to this survey. Indeed defining mutually exclusive units both in terms of their "centers" (i.e., the person, by name or title, who will report) and in terms of their "boundaries" (i.e., a description, in the case of the JVRU, of the class of jobs covered) would seem necessary in any survey of business operations. A major contribution of the development of the Job Vacancy Survey has been to make the need for this operation explicit and to evolve techniques and systems for meeting it.

The primary regular output of the survey is three-month moving averages of numbers of job vacancies classified by occupation and location. While there may be some conceptual advantage to the routine preparation of the data in the form of moving averages rather than point estimates, the major factor in the decision to take this approach was economy, particularly in view of the previous decision to employ a permanent field staff, of spreading the workload of all the personnel required to maintain a complex survey system over time rather than being obliged to concentrate it at points in time. In theory this decision adds a dimension to the design problem in that the sampler must consider sampling in the time dimension as well as in the "reporting unit dimension." In practice, however, the sampler does not have much freedom. It is necessary to introduce regularity or symmetry into the operation. This suggests that the operation should be periodic in nature. Thus the choice of procedure, with respect to time, has been determined by four considerations:

1. Estimates are required on a monthly basis both of the average (at fine levels of aggregation) for the three months ending with the current month (at higher levels of aggregation). Hence, the survey frequency could not be less than monthly.
2. The operational requirements of the assignment of workloads to field staff and the processing of results make it impracticable to have a frequency greater than twice monthly.
3. Different frequencies for different strata, a possibility considered at one time, would lead to intolerably complicated operational problems.
4. Given the above constraints it is desirable to have a frequency as high as possible.

We have chosen, therefore, a frequency of twice monthly for the survey. The sample is a rotating one, with details of the rotation procedure given later, and the sample size and allocation have been determined with regard to the reliability of estimates when averaged over six survey cycles (i.e., averaged over three months). Our estimation procedures produce both one-cycle and two-cycle averages as well as the six-cycle average, although we customarily produce them at higher levels of aggregation.

4. SAMPLE DESIGN

The sample design may be described briefly as an interview second phase stratified area sample of Job Vacancy Reporting Units superimposed on a mail first phase simple stratified list sample of these units. Sample replication is maintained through all phases of the sample selection to provide simple variance estimates as well as certain other features described more fully later. The mail sample is also stratified (i.e., post-stratified) by response class (mail respondents with vacancies, mail respondents with no vacancies, and nonrespondents) prior to the interview phase, the post-stratification being maintained in the estimation procedure.

4.1 Mail Phase

The population of JVRU's is stratified on the basis of size, industry, and location. This stratification is rough, since we are often in some doubt as to the proper size and industry classifications to assign to a unit. Furthermore the size in terms of employees is not always a reliable indicator of the expected number of vacancies. The industry classification is introduced as a rough indicator of the occupational mix of the employees in a JVRU. Thus the industry by location stratification bears a rough relation to our major domains of interest, which are vacancies cross-classified by occupation and location.

Within a stratum, say stratum h , JVRU's are assigned at random to M_h panels (numbered $0, 1, \dots, M_h-1$) and within a panel to two subpanels (numbered $0, 1$). The subpanel designations control the sample replication mentioned earlier. One of these panels is chosen at random (actually systematically) on each survey occasion, the probability of selection of a JVRU in stratum h in the mail phase on a particular occasion being thus $1/M_h$.

There are advantages⁶ in some strata, however, to restricting the sample rotation to a smaller set of panels than the whole M_h so that we introduce a rotation parameter S_h (which in practice always takes on the value 2, 4, or 8)

⁶ In a two-phase mail interview survey there are also dangers of the "educational effect" on the interviewees that results from being interviewed.

not larger than M_A . The selection pattern for panels is then $0, 1, \dots, S_A-1, 0, 1, \dots$, i.e., only the first S_A panels ever enter the sample and they do so in rotation. The rotation feature is an operational consideration which does not affect the estimation procedure. Its main advantages are (a) it lightens the burden of determining the geographic distribution of the sampled units, a feature which is important in setting up the interview procedures, and (b) it should improve both the rate and the quality of response in the mail phase.

4.2 Interview Phase

The second (interview) phase sample uses both stratification and clustering. Stratification is the division of Canada into areas called Interview Districts (ID's); clustering is the division of ID's into clusters. Strictly speaking both the strata and the clusters are divisions of the list of JVRU's rather than the area which contains them. They do have some geographic connotation however and it is convenient, though not strictly accurate, to think of them as areas.

There are six clusters in each ID and on each survey occasion two of these six clusters are in-sample for interview purposes. In one of these clusters in each ID all mail-phase units with subpanel 0 designations are regarded as potential interviewees whatever their response status, which is of course unknown in advance, while in the other cluster all mail-phase units with subpanel 1 designations are potential interviewees. The next time this particular pair of clusters (the clusters are chosen systematically and in rotation) are in-sample the interview subpanels are reversed. The term "potential" is used above because in some of our response post-strata we allow further subsampling in the field as a means both of improving statistical efficiency and of controlling interviewer workloads.

The selection of the mail sample from the list of JVRU's and the selection of the clusters for the interview phase from the set of ID's are independent processes. The ID's and clusters are delineated with a view to equalization of workloads over survey occasions and over interviewers, two of whom are assigned to each ID, on each survey occasion. A mail phase unit is then in-sample for the interview phase if it has been assigned to a selected cluster and if it bears the appropriate subpanel designation for that cluster.

Each of the two interviewers assigned to an ID conducts the interviews in one cluster. The sample replication which began by splitting the mail sample into random halves (subpanels) within each selected panel in each stratum is therefore carried through in the interview phase to the interpenetration of enumerator assignments. There are a number of operational advantages, in addition to the technical one of simple variance estimates, to this procedure for assigning interviewer workloads:

1. One interviewer in each pair provides a "back-up" for the other. If one enumerator is unable to complete his assignment on a particular occasion no great harm would be done to the estimates for that occasion for, because of the sample interpenetration, the uncompleted assignment is represented by the completed one. This gives a built in allowance for vacations, sickness, turnover, etc., among the field staff.
2. We always have readily available a random half of our sample for special assignments and enquiries both of a substantive and of a methodological nature.

3. The sample interpenetration allows us to isolate and estimate the interviewer contribution to response bias and response variance.⁷

We complete this section by giving the estimator we use:

$$\begin{aligned}
 Y^a & \text{ is value of some characteristic, say total vacancies, for the domain of} \\
 & \text{interest } a, \text{ say, some occupation by location cross-classification,} \\
 x_{hi}^{ea} & \text{ is value of the characteristic given in the mail return for the } i\text{th sample} \\
 & \text{unit in stratum } h \text{ (provided there is a mail return),} \\
 y_{hi}^{ea} & \text{ is corresponding value in the interview return (if there is an interview} \\
 & \text{return),} \\
 x_{hi}^{ea} & = \begin{cases} x_{hi}^{ea} & \text{if the } i\text{th unit in stratum } h \text{ is in subpanel } s(s=0, 1) \\ 0 & \text{otherwise,} \end{cases} \\
 y_{hi}^{ea} & = \begin{cases} y_{hi}^{ea} & \text{if the } i\text{th unit in stratum } h \text{ is in subpanel } s \\ 0 & \text{otherwise,} \end{cases} \\
 \delta_{hi} & = \begin{cases} 1 & \text{if the unit indexed by } hi \text{ is a respondent in the mail phase} \\ 0 & \text{otherwise,} \end{cases} \\
 \epsilon_{hi} & = \begin{cases} 1 & \text{if the unit indexed by } hi \text{ is interviewed in the interview phase} \\ 0 & \text{otherwise,} \end{cases} \\
 \eta_{hi} & = \begin{cases} 1 & \text{if the unit indexed by } hi \text{ has at least one vacancy in its mail return} \\ 0 & \text{otherwise.} \end{cases}
 \end{aligned}$$

Then an estimate of $Y^a/2$, derived from units in a subpanel s , is

$$\begin{aligned}
 \hat{Y}_s^a & = \sum_h \sum_i M_h \delta_{hi} \eta_{hi} x_{hi}^{ea} \\
 & + W_1 \sum_h \sum_i M_h \delta_{hi} \eta_{hi} \epsilon_{hi} (y_{hi}^{ea} - x_{hi}^{ea}) \\
 & + W_2 \sum_h \sum_i M_h \delta_{hi} \epsilon_{hi} (1 - \eta_{hi}) y_{hi}^{ea} \\
 & + W_3 \sum_h \sum_i M_h (1 - \delta_{hi}) \epsilon_{hi} y_{hi}^{ea}
 \end{aligned}$$

The first term here is the weighted mail returns for respondents with at least one vacancy; the second term provides a correction to the first on the basis of the returns from an interview of a subsample of these respondents; the third term (which could be written formally similar to the first and second, all of the x -values being zero) is the weighted interview returns for respondents with no vacancies in the mail phase; the fourth term accounts for the nonrespondents in the mail phase. The values of W_1 , W_2 and W_3 are given by

$$W_1 = \frac{\sum_h \sum_i M_h \delta_{hi} \eta_{hi}}{\sum_h \sum_i M_h \delta_{hi} \eta_{hi} \epsilon_{hi}},$$

$$W_2 = \frac{\sum_h \sum_i M_h \delta_{hi} (1 - \eta_{hi})}{\sum_h \sum_i M_h \delta_{hi} \epsilon_{hi} (1 - \eta_{hi})}, \text{ and}$$

$$W_3 = \frac{\sum_h \sum_i M_h (1 - \delta_{hi})}{\sum_h \sum_i M_h (1 - \delta_{hi}) \epsilon_{hi}}.$$

⁷ See [2, 3].

so that the second, third, and fourth components in the previous formulas are really ratio estimates.

The analytic expression for the variance is extremely complicated. Although we have derived a reasonable approximation to it for sample design purposes, we do not use it in any of our operational procedures. Fortunately the sample replication feature gives the very simple variance estimator:

$$\text{var } \hat{Y}^c = (\hat{Y}_0^c - \hat{Y}_1^c)^2$$

where

$$\hat{Y}^c = \hat{Y}_0^c + \hat{Y}_1^c$$

is our estimate of Y^c . The extension of the last two formulas to the six-cycle average is quite straightforward.

The estimate given above is essentially unbiased. However, at fine levels of disaggregation the components multiplied by W_1 , W_2 , and W_3 respectively are likely to have large sampling variations, particularly for the one occasion estimates. In fact as the level becomes finer a point is reached at which the contribution to the mean square error of the estimates by the sampling variance will be larger than the contribution from the squared bias when we simply weight up for nonrespondents. In this event a better estimate than the one given above would be

$$\hat{Y}^c = W \sum_k \sum_i \{ \delta_{hi}(1 - \epsilon_{hi})x_{hi}^{12} + \epsilon_{hi}y_{hi}^{12} \}$$

where

$$W = \sum_k \sum_i w_{1h} / \sum_k \sum_i w_{1h} \{ \delta_{hi}(1 - \epsilon_{hi}) + \epsilon_{hi} \}.$$

We are conducting theoretical and empirical research with the object of setting up rules as to which estimates should be used for each set of tabulations produced by the system.

5. SUPPORTING COMPUTER SYSTEMS

The design outlined in the previous section is a complex one, certainly the most complex statistical survey undertaken on a regular basis by the Dominion Bureau of Statistics, and a challenging task has been the production of systems for maintaining it as a continuing survey.

The frequency of the survey is twice monthly so that the various operations must adhere to a tight schedule. Interviews begin about a week after the reference day for each cycle and continue for about two weeks when interviewing with respect to the interview subsample for the next reference day must begin. The mail and interview returns are processed at the head office on a continuous basis. Coding, editing, and keypunching for each reference day must be completed within a month of the reference day and tabulation printouts are available for distribution about a week later.

The master file contains about 150,000 JVRU's including all JVRU's which are members of multiple JVRU structures, and is itself a sample drawn from a

central file of about 500,000 companies or other legal entities. All large companies and other legal entities have been restructured for the Job Vacancy Survey, as mentioned earlier, into JVRU's. Both of these files are computer maintained and all sampling both from the central file to set up the master file and within the master file itself, as well as sample maintenance and updating, is done by computer as part of what we call the master file subsystem.

The mail sample of about 20,000 JVRU's is selected well in advance of each reference day and address labels (as well as descriptions of the units) together with various control listings are printed out. An additional label and list print-out of the interview subsample is produced for mail-out to the interview staff in the field.

The maintenance of the reporting structure (profiles) of large organizations is considered an extremely important part of controlling the quality of the survey, and one of our subsystems, the profile display subsystem, is used periodically to print out lists of JVRU's in a format which displays the complex interrelations between JVRU's, companies and enterprises. It also produces an index of JVRU enterprise associations. These printouts are designed principally for the use of the field staff who have the continuing responsibility of updating the profiles in conjunction with the regular interview assignments.

Since we began developing the survey before knowing precisely the nature and dimensions of the data it was intended to produce, it was essential to produce a flexible data processing subsystem. The model now operating has the following features:

1. Allows the addition of variables to the basic set of variables for which estimates are to be produced. Thus we are able to process data from special additions to the regular survey simply by writing control cards specifying the location of the new variables in the input.
2. Allows the specification of new, or the respecification of old, domains of interest defined by any (up to) three-way classification of any of the variables.
3. Retains all historical information and allows the calculation and tabulation of averages over any set of up to six survey occasions.
4. Has an option to calculate and print out, in association with any tabulation of estimates, the variance estimates.
5. Allows the specification of up to 99 different estimating functions as required.

These features, which are user-oriented in the sense that the user can write his own control cards for any of the features, give a high degree of flexibility in survey data processing.

6. COMPARISON WITH UNITED STATES' DEVELOPMENTS

The data generated by the Canadian Job Vacancy Survey will have to be carefully assessed, by manpower analysts and other economists, in conjunction with other labor market series, before their meaningfulness can be properly evaluated. At present, although the Survey is operational, the data have not yet been released to the public. They are, however, being used internally to evaluate survey design (sample allocation is still undergoing modification) and to test, in a preliminary fashion, their broad analytical relevance. This (perhaps excessively) cautious attitude to publication stands in marked contrast to the United States' policy in this field as do other major features of the

Canadian program. This comparison with the United States merits brief comment.

Since 1964 the United States Department of Labor has conducted a series of experimental job vacancy surveys in several cities,⁸ and non-governmental institutions⁹ have also undertaken pilot projects. The most recent government program begun early in 1969 was a series of cooperative federal-state surveys for collecting job vacancy statistics along with labor turnover data for selected metropolitan areas. Only some of the data will be classified by occupation and the surveys cover only the manufacturing and mining industries although it is intended to extend coverage both geographically and industrially to the level of a national survey yielding occupational information as well as vacancy totals and turnover.¹⁰

While there are close definitional similarities between the Canadian and United States' surveys (indeed the first Canadian experiments borrowed heavily from the United States' experience, particularly in terms of job vacancy concepts)¹¹ there are striking differences in approach in most other respects. Thus the Canadian survey is a two-phased operation designed to yield maximum feasible occupational and geographic detail for all non-agricultural industries. It is based on a specifically defined reporting unit designed to minimize reporting error and facilitate the *ad hoc* or periodic collection of additional and related labor market information (including, perhaps, turnover data). The design was governed by the data requirements for highly selective manpower programs rather than the need for an additional economic indicator.

The United States' developments appear to point in quite another direction. In particular, the use of a standard reporting unit (the establishment) in a single-phased (mail) survey within a labor turnover framework suggest a stronger orientation to an economic indicator or barometric type of statistic with, however, greatly enhanced diagnostic potential. Further comparisons of the two programs will have to await analysis of the results of both.

7. CONCLUSIONS

The positive achievements of the Canadian program to date are:

1. An operationally feasible definition of current and "future starting date" vacancies has been developed and successfully tested.
2. Response units, capable of reporting job vacancy data with minimal error, have been defined and incorporated as sample units of an ongoing survey operation.
3. A large-scale and flexible survey capacity, comparable in size to the household survey capacity, has been established in the enterprise sector.

The Job Vacancy Survey will provide detailed data on unfilled labor demand by occupation but will not provide statistics on filled demand, i.e., employment by detailed occupation. The survey was initiated, in large part, because of the marked asymmetry in labor intelligence between demand and supply (unemployment) measures. The provision of the Job Vacancy data will itself inevitably reveal the inadequacy of presently available employment measures, e.g., the

⁸ See, in particular, [4] and also [6].

⁹ See [1, 8, 9].

¹⁰ See [7].

¹¹ See [10].

absence (apart from decennial census information) of disaggregated occupational statistics. The next stage of development in the process of creating a comprehensive network of labor market information, then, will be in the direction of current occupational employment data. The experience gained from both existing establishment surveys and the Job Vacancy Survey will prove invaluable in this effort.

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JOB VACANCY SURVEY

A Brief Description of Methodology and Data Uses

One of the first steps of the Department of Manpower and Immigration, when it was formed some four years ago, was to embark on the development of a systematic collection of comprehensive job vacancy data, in cooperation with the Dominion Bureau of Statistics. These efforts have now reached the stage where the first tabulations on the private sector of the economy are available for testing and evaluation by the Department. Full survey coverage should be reached by May and the first complete results should be available by September of this year.

The purpose of the Job Vacancy Survey, carried out for the Department by the Dominion Bureau of Statistics, is principally to obtain periodic estimates of the extent and occupational and geographic characteristics of the unsatisfied demand for labour. It is a sample survey carried out by means of questionnaires mailed to hiring authorities, and followed up by personal interviews. It is a comprehensive survey, in the sense that it covers firms and organizations of all sizes and in virtually all fields of economic activity.

The survey encompasses current vacancies and future starting date vacancies. Current vacancies are jobs that were vacant for the full day on the day of the survey; were immediately available; and for which the respondent was actively seeking new workers from outside his establishment by taking some action, within the four previous weeks. Future starting date vacancies are jobs for which the respondent was actively seeking full-time workers from outside his establishment to begin work at some future starting date. Jobs held open for employees on lay-off to be recalled within a specified period of time or jobs for which new workers have been hired but are scheduled to work at a later date are excluded from the survey. Also internal vacancies, i.e. those jobs to be filled by transfer, promotion or demotion of workers within the firm, are outwith its scope.

Specific information requested in the survey questionnaire is intended to establish the number and occupational characteristics of the vacant jobs, classify

the existing job openings into current and future starting date vacancies, into vacant jobs for full-time and other than full-time work, into vacant jobs for full-time work which remained unfilled for less than a month and for more than a month. For vacant full-time jobs the questionnaire asks for the minimum hiring rates of pay.

The Job Vacancy Survey is now in its third stage. The first stage involved a pilot project designed to test the feasibility of the collection by survey methods of job vacancy data in Canada. In the summer of 1966 a questionnaire was sent by mail to approximately 17,000 establishments in Ontario. The project brought to light a number of sources of confusion to respondents which endangered the reliability of the results of a job vacancy survey. Action was taken to redesign the questionnaire and present a stricter specification of a job vacancy. However, a more important result of the pilot survey was the highlighting of the problem of hiring authority. It was established that in many firms and particularly among the more complex firms there is multiple responsibility for hiring. The hiring function within the enterprise may be dispersed geographically and/or occupationally. Hence in large firms no single source can, or can without difficulty, provide the requisite data.

The second stage of survey development involved the determination of the location of the diverse hiring authorities within multi-establishment firms. The hiring authorities are the sources of information for the purposes of the survey and are designated Job Vacancy Reporting Units. The task of determining these reporting units is now complete.

The third stage involves the gathering of job vacancy data through a two-phase mail and interview survey and processing them through a computerized operation. The interview sample is selected from the relatively large mail sample and is a source of additional information. The results of the survey will be in the form of three-month moving averages of vacancies tabulated according to a specified set of characteristics. It is believed that the average number of vacancies

over three months is a more meaningful measure than the number existing at the end of any one month. The estimation of moving averages also has the advantage of spreading the workload of the survey personnel with consequent lowering of costs.

At present, the survey is being conducted only within the private sector of the economy. The remainder of the economy will be surveyed when the job vacancy reporting units for the three levels of government, and institutions (hospitals, universities, etc.) are entered into the survey universe. It is planned to incorporate these by May, 1970. When complete coverage is reached, the survey will embrace over 100,000 reporting units and extend to all sectors of the economy (with the exception of agriculture, private households and the self-employed).

When the questionnaires are returned, the job vacancies are coded by occupation using the U.S. Department of Labor's Dictionary of Occupational Titles. Four levels of aggregation by occupation are made possible. The highest level of aggregation is the nine categories at the one-digit level; the second is the 84 divisions at the two-digit level; the third is the 603 groups at the three-digit level; and the fourth is the 3,158 groups of job titles at the six-digit level. It should be added here that a Canadian Classification and Dictionary of Occupational Titles is being prepared by the Department and will be used in the survey in 1971.

The job vacancies are also coded geographically, using the Standard Geographical Code as prepared by the Central Classification Staff of the Dominion Bureau of Statistics. This is a six-digit code. The first two digits identify the province or territory. The second two identify the census division or county and the third pair identify the census sub-division or municipality.

The potential analytical use of job vacancy data is further enhanced by its coding by industry using the Standard Industrial Classification (1960) down to the three-digit level.

The data derived from the Job Vacancy Survey will close serious gaps in our knowledge of labour market conditions. Studies and research concerning job vacancy data in Canada, the United States and other countries have clearly indicated

the operational usefulness of such statistics. It is anticipated that the results of the survey will be readily applied by the Department in three major areas: in counselling activity including the selection of candidates for the Occupational Training for Adults and the Manpower Mobility programs; in the assessment of training needs and consequent changes necessary in the capacity and organization of training institutions; and in the planning of the immigration program.

The importance of counselling activity in the Canada Manpower Centres and the responsibilities of manpower counsellors have been increased greatly in the past few years. These counsellors are now able to offer more assistance to workers towards the acquisition of useful skills and movement to jobs in other areas. Their responsibilities were further heightened by the transfer of the management of the training of adults from provincial authorities to the Department. The effectiveness of the decisions of these manpower counsellors is increasingly dependent on comprehensive information on the demand for labour by occupation and area. They need to know in which occupations there is strong demand and in which areas the job openings are concentrated.

The job vacancy data will also be used as a guide to regional training needs. The data will facilitate the planning of the capacities and structures of training courses commenced and continued. The job vacancy figures will be useful to employment service officials and educational authorities primarily in the formation and organization of short-term training courses. For longer courses the current job vacancy information will need to be supplemented by information on medium and long-term job prospects in the occupations concerned.

It is necessary to encourage substantial immigration to Canada in order to sustain a satisfactory level of economic growth. For a successful integration of immigrants it is essential that those who enter the work force find employment quickly and in jobs which are suited to their talents. These are desirable ends not only for the achievement of an efficient allocation of labour resources in the Canadian economy

but in order to maximize job satisfaction on the part of the immigrant. Consequently it is important both to the community and to the individual that the occupational qualifications of immigrants do not get too far out of line with the occupational requirements of the economy at any given time. The immigration program must take account of the skills and qualifications of the immigrants and the demand for these skills and qualifications in the economy. It is anticipated that the results of the job vacancy survey will assist this process by providing evidence of occupational shortages which might be filled by the selection of suitably qualified immigrant labour and by indicating developing shortages in particular occupations, with implications for longer-term policy in regard to the attraction and selection of immigrants.

Quite apart from their utilization by the Department of Manpower and Immigration the job vacancy data will be of use to many other groups in the community. Without doubt many uses remain to be discovered. The data will be of assistance to educational institutions in planning capacity and course structures; to employers in assessing the future availability of specific categories of labour and the implications for on-the-job training, hiring standards and internal promotion policy; and to trade unions in formulating their attitudes to changes in occupational demand, wage levels, hiring standards and training and apprenticeship schemes. In addition, of course, the job vacancy series will undoubtedly be used as an indicator of economic conditions. It is not possible to forecast how much value the data will have in this context but other countries have found series of unfilled job vacancies to be one of the best indicators of an approaching decline in activity.

This form contains questions concerning two distinct surveys: the Job Vacancy Survey (printed below) and the Employment Survey (printed on the reverse side). Please complete both reports.

Ce questionnaire sert à deux enquêtes distinctes: la partie ci-dessous concerne l'enquête sur les Emplois vacants et l'autre partie (au verso) l'enquête sur l'Emploi. Veuillez répondre aux deux enquêtes.

Please correct any errors in the above address
Corriger, s'il y a lieu, le nom et l'adresse ci-dessus

These confidential reports are required under the Statistics Act of Canada, Chap. 257, R.S.C. 1952
Déclaration exigée en vertu de la Loi sur la statistique, chap. 257, S.R.C., 1952

JOB VACANCY SURVEY/ENQUÊTE SUR LES EMPLOIS VACANTS

This page has to be spread open to the left in order to complete this report

Veuillez ouvrir à la page 4 afin de compléter cette enquête

REFERENCE DAY June 25, 1971

JOUR DE RÉFÉRENCE 25 juin, 1971

Did you have any vacancies on the reference day?

Vacancies are:

Jobs that were vacant for the full reference day, AND

Jobs that were available immediately or at some specified future date AND

Jobs for which you sought new workers by taking some action such as advertising, interviewing "walk-ins", etc., during the four weeks before the reference date.

NO check (✓) here ☐ print your name, position and telephone number overleaf, complete the Employment Survey and mail report.

YES complete sections 1 to 7 on page 4 for each separate job title or job description for which you had vacancies on the reference day.

Aviez-vous des emplois vacants le jour de référence?

Emplois vacants:

emplois qui sont vacants pendant tout le jour de référence ET

qui sont à remplir immédiatement ou à une date future déterminée ET

pour lesquels, dans les quatre dernières semaines précédant le jour de référence vous avez cherché de nouveaux employés, en interviewant des personnes qui se sont présentées, etc.

→ NO cochez (✓) ici ☐ et au verso, inscrivez votre nom en lettres moulées, votre fonction et votre numéro de téléphone; répondez à l'enquête sur l'Emploi et renvoyez la formule.

OUI veuillez répondre aux questions 1 à 7 sur la page 4 pour chaque titre ou description d'emploi pour lequel vous aviez des postes vacants le jour de référence.

- 2 -

EMPLOYMENT SURVEY

Please complete this questionnaire for the week ending on the reference day June 25, 1971

1-NUMBER OF PAID EMPLOYEES DURING THE WEEK ENDING ON THE REFERENCE DAY

Count as paid employees:

- All regular full and part time employees receiving wages or salaries
- Casual employees who worked 7 hours or more during the reference week
- Employees absent with pay (on vacation, sick leave, etc.)
- President, directors, other officers of incorporated companies if drawing salary on a regular basis
- Relatives of owners of businesses working for them regularly with pay
- Commission agents for whom you are required to make Canada or Quebec Pension Fund and/or Unemployment Insurance contributions

MALE

FEMALE

Do not count as paid employees:

- Persons working regularly but not receiving wages or salaries, i.e. receiving only: tips, fees, shares of profits, etc.
- Persons supplying services to your business on a contract basis, i.e. working on their own or employed by another firm
- Persons on strikes, lay-offs, unpaid vacation or sick leave, etc.

TOTAL (1)

2-NUMBER OF WORKING OWNERS AND PARTNERS OF UNINCORPORATED BUSINESSES, INCLUDING ACTIVE OWNERS OF UNINCORPORATED PROFESSIONAL PRACTICES SUCH AS DOCTORS, DENTISTS, ACCOUNTANTS, LAWYERS, ARCHITECTS, ETC.

(2)

(3)

3-NUMBER OF RELATIVES OF BUSINESS OWNER(S) WORKING REGULARLY WITHOUT PAY.

TOTAL of 1, 2 and 3

If you have any questions, phone
Si vous avez des questions à poser, téléphonez à

St. John's, Nfld./T.-N. (726-0713)
Halifax, N.S./N.-É. (426-3110)
Montreal, Que./P.Q. (879-5724)
Ottawa, Ont. (992-0256)

Print your name - *Écrire votre nom en lettres moulées:*

Official Position Occupied - *Fonction occupée*

ENQUÊTE SUR L'EMPLOI

Veuillez remplir ce questionnaire pour la semaine terminée le jour de référence 25 juin, 1971

1 - NOMBRE D'EMPLOYÉS RÉMUNÉRÉS AU COURS DE LA SEMAINE TERMINÉE LE JOUR DE RÉFÉRENCE

Comptez comme employés rémunérés:

- Tous les employés réguliers à plein temps et à temps partiel qui reçoivent un salaire ou un traitement
- Employés intermittents ayant travaillé 7 heures ou plus pendant la semaine de référence
- Employés absents avec rémunération (en vacance, congé de maladie, etc.)
- Président, directeurs et autres administrateurs de sociétés constituées en corporation qui touchent une rémunération régulière
- Membres de la famille des propriétaires qui travaillent régulièrement pour ceux-ci et touchent un salaire
- Vendeurs à commission pour lesquels vous êtes requis de contribuer aux fonds de Pension du Canada ou du Québec et/ou à l'Assurance Chômage

Ne comptez pas comme employés rémunérés:

- Les personnes qui travaillent régulièrement sans toucher un salaire ou un traitement, c.à.d., qui reçoivent seulement des pourboires, des honoraires, une part des profits, etc.
- Les personnes qui fournissent des services à votre entreprise sur une base contractuelle, c.à.d., qui travaillent à leur propre compte ou pour une autre entreprise
- Les personnes en grève, mise à pied temporaire, congé de maladie ou vacance non payé, etc.

2 - NOMBRE DE PROPRIÉTAIRES ACTIFS ET PARTENAIRES D'ENTREPRISES NON CONSTITUÉES EN CORPORATION, Y COMPRIS LES PROPRIÉTAIRES ACTIFS DE BUREAUX PROFESSIONNELS TELS QUE MÉDECINS, DENTISTES, COMPTABLES, AVOCATS, ARCHITECTES, ETC.

3 - NOMBRE DE MEMBRES DE LA FAMILLE DES PROPRIÉTAIRES QUI OCCUPENT UN EMPLOI RÉGULIER SANS TOUCHER DE SALAIRE.

TOTAL de 1, 2 et 3

Nearest DBS Regional Office:
le bureau régional de la Statistique le plus rapproché:

Toronto, Ont. (966-6591)

Winnipeg, Man. (985-4022)

Edmonton, Alta./Alb. (424-0251 ext. 259)

Vancouver, B.C./C.-B. (666-3780)

sielle:

Telephone (area code and number -
indicatif régional et numéro)

Date:

